



**INSTRUCTION
&
MAINTENANCE
MANUAL**

**LP2100-SRT LOW
PROFILE &
HP2100-SRT HIGH
PROFILE
STRETCH WRAP
MACHINES & OPTIONS**

COUSINS PACKAGING INC.
6450 Northam Drive, Mississauga, Ontario L4V 1H9 Canada
Phone: (905) 678-6655 Fax: (905) 678-3429
www.cousinpackaging.com

TABLE OF CONTENTS

1:0	BEFORE STARTING THE MACHINE.....	7
2:0	SPECIFIC CAUTIONS AND WARNINGS.....	9
3:0	MACHINE DESCRIPTION	11
3:1	Machine Specifications.....	11
3:1:1	LP-SRT Low Profile	11
3:1:2	HP-SRT High Profile.....	12
4:0	INSTALLATION	15
4:1	Moving the Machine	15
4:1:1	Low Profile	15
4:1:2	High Profile	15
4:2	Unpacking and Inspection	15
4:2:1	LP-SRT Low Profile	15
4:2:2	HP-SRT High Profile.....	16
4:3	Extended Tower Assembly (Optional)	17
4:3:1	LP-SRT Fold-Down Tower.....	17
4:3:2	HP-SRT Fold-Down Tower	18
4:4	Pre-Operation Check and Final Assembly	18
4:5	General Power Requirements.....	19
5:0	SET-UP AND OPERATING PROCEDURES	21
5:1	Operating Controls – Exterior Control Panel	21
5:1:1	Main Disconnect Switch (Optional).....	22
5:1:2	Emergency Stop Push-Pull Button.....	22
5:1:3	Power Off–Reset Selector Switch.....	22
5:1:4	Wrap Cycle START/PAUSE Keypad Button	23
5:1:5	Turntable JOG Keypad Button.....	23
5:1:6	Film Carriage Elevator RAISE Keypad Button.....	23
5:1:7	Film Carriage Elevator LOWER Keypad Button.....	23
5:1:8	Film Carriage RAISE SPEED Keypad Buttons	23
5:1:9	Film Carriage LOWER SPEED Keypad Buttons.....	24
5:1:10	Film FORCE TO LOAD Control Keypad Buttons	24
5:1:11	POWER Indicator Light.....	24
5:1:12	FAULT Indicator Light.....	24
5:2	Operator Interface Panel (HMI)	25
5:2:1	Initialization Screen.....	26
5:2:2	Control Power Disabled Screen.....	26
5:2:3	Start-up Splash Screen.....	27
5:2:4	Main Menu Screen.....	27
5:2:4:1	<i>Wrap Program Select Screen.....</i>	<i>28</i>
5:2:4:2	<i>Machine Settings Screen.....</i>	<i>28</i>

5:2:4:2:1	Wrap Count Settings A (or B or C) Screen.....	29
5:2:4:2:1.1	Top Wrap Revolutions Setting.....	30
5:2:4:2:1.2	Base Wrap Revolutions Setting.....	30
5:2:4:2:2	Photo-Eye Settings A (or B or C) Screen.....	30
5:2:4:2:2.1	Auto Load Height Photo-Eye Off / On Selection.....	31
5:2:4:2:2.2	Top of Load Film Overlap Setting.....	31
5:2:4:2:3	Film Force Settings A (or B or C) Screen.....	32
5:2:4:2:3.1	Reduced Bottom Film Force Selection.....	32
5:2:4:2:3.2	Delayed Film Force Revolutions Setting	33
5:2:4:3	Calibration Settings Screen.....	33
5:2:4:3:1	Language Selection	34
5:2:4:3:2	Measures Selection.....	35
5:2:4:3:3	Wrap Cycle Watchdog Timer Setting	35
5:2:4:3:4	Turntable Start Speed Setting.....	35
5:2:4:3:5	Turntable Run Speed Setting.....	36
5:2:4:3:6	Turntable Realign Speed Setting	36
5:2:4:3:7	Turntable Realign Delay Setting.....	37
5:2:4:3:8	Film Carriage Elevator Fast Speed Setting.....	37
5:3	Super Rapid Thread II™ Prestretch Door Safety Switch	38
5:4	Turntable Speed Adjustment.....	38
5:5	Film Carriage Elevator Speed Set-Up	38
5:5:1	Film Carriage Elevator Raise Speed	38
5:5:2	Film Carriage Elevator Lower Speed.....	38
5:6	Film Carriage Limit Switch Striker Adjustment	39
5:7	Auto Load Height Sensing Photo-Eye Adjustment	39
5:8	Film Carriage Descent Obstruction Plate Safety Switch	39
6:0	WRAPPING A LOAD.....	41
6:1	Placing the Load on the Turntable.....	41
6:2	Threading the <i>Super Rapid Thread II™</i> Prestretch	42
6:3	Attaching the Film.....	46
6:4	Starting the Wrap Cycle (Initial Set-up)	46
6:5	Wrap Cycle Sequence of Operation.....	46
6:5:1	Semi-Automatic Wrap Cycle Sequence.....	46
6:6	Re-Wrapping the Load	47
7:0	REMEDIAL ADJUSTMENT	49
7:1	Turntable Soft-Start.....	49
7:2	Load Toppling or Sliding	49
7:3	Film Tearing & Puncturing.....	49
7:4	Film Roping Bar (Optional).....	51
7:5	Uneven Top Surfaces.....	51
7:6	Auto Load Height Photo-Eye False Signals	52
7:7	Top Sheet Application	52
7:8	Reinforcing Band Application	53

8:0	MAINTENANCE REQUIREMENTS	55
8:1	Lubrication	55
8:2	Maintenance Frequency Recommendations	55
8:2:1	LP-SRT Low Profile	55
8:2:2	HP-SRT High Profile	56
9:0	MAINTENANCE AND ADJUSTMENTS.....	59
9:1	Film Carriage Lift Chain Adjustment	59
9:2	Turntable Removal & Installation	59
9:2:1	LP-SRT Low Profile	59
9:2:2	HP-SRT High Profile	60
9:3	Turntable Drive Chain Adjustment.....	60
9:3:1	LP-SRT Low Profile	60
9:3:2	HP-SRT High Profile	61
9:4	Turntable Support Rollers (LP-SRT Low Profile).....	61
9:5	Turntable Support Wheels (HP-SRT High Profile)	61
9:6	Film Carriage Limit Switch Lever Arm Adjustment	62
9:7	Auto Load Height Sensing Photo-Eye Adjustments.....	62
9:8	Variable Frequency Drives.....	63
9:9	Turntable Positive Alignment Set-Up and Adjustment.....	63
9:10	Turntable Accu-Count™ Proximity Sensor Adjustment	65
9:11	Dancer Proximity Sensor Installation & Adjustment	65
9:12	Carriage Height Pulse Proximity Sensor Adjustment	67
9:13	Film Carriage Safety Switch Adjustment.....	67
9:14	Prestretch Roller Cleaning Procedure	69
10:0	TROUBLE-SHOOTING	71
10:1	Trouble-shooting Operator Interface Fault Messages.....	71
10:1:1	Film Fault (Optional)	71
10:1:2	Wrap Cycle Watchdog Timer Fault	72
10:1:3	Film Carriage Safety Switch Tripped Fault	73
10:1:4	Film Carriage Height Sensor Fault.....	74
10:2	Trouble-Shooting Guide.....	77
11:0	PARTS LISTS	85
12:0	COMPONENT MANUALS	
13:0	MECHANICAL DRAWINGS	
14:0	ELECTRICAL DRAWINGS	
15:0	VFD PARAMETERS	
16:0	SUPPLEMENTS	

1:0 BEFORE STARTING THE MACHINE

Please refer to the following checklist before calling your Cousins Packaging distributor or the factory for start-up assistance. This will prevent confusion and additional expense during the start-up process.

1. Check for any freight damage, (hidden or apparent), and if found report it to the carrier. **It is the responsibility of the consignee to report any damage incurred during shipment.**
2. Uncrate and assemble the machine. If the machine is equipped with an extended tower, erect the tower according to the instructions in Section 4:3.
3. The machine must operate on a level floor or **the life of certain parts will be reduced substantially!** This is **especially important** in the case of the LP-SRT Low Profile stretch-wrapper.
4. **DO NOT START THE MACHINE BEFORE REMOVING STRAPPING SECURING THE TURNTABLE AND / OR THE TURNTABLE SHIPPING BOLT**, located on the face of the turntable on LP-SRT machines!
5. Before operating the machine, remove any Styrofoam, strapping, or shipping blocks from beneath the film carriage, that may be present.
6. Actuate the Film Carriage Descent Obstruction Plate upwards and then release, to ensure that the plate mechanism and safety switch assembly are functioning freely. **If the Descent Obstruction Plate becomes jammed in the recessed position, the film carriage lower function will become inoperable.**
7. Connect the incoming electrical power supply and verify that the voltage is correct, (refer to Section 4:6). **Do not connect or attempt to operate the machine without supplying proper and consistent electrical input. Potential damage may occur that will void warranty.**
8. Ensure that the two limit switches mounted on the film carriage operate between the Upper and Lower Limit Switch Strikers. These strikers are the adjustable chamfered blocks mounted to an aluminum rail on the side of the tower. These strikers define the maximum travel of the carriage. **WITHOUT THESE STRIKERS AT THE TOP AND BOTTOM TO TELL THE CARRIAGE TO STOP, THE CARRIAGE WILL OVER-RUN ITS SAFE OPERATING RANGE, POTENTIALLY CAUSING SERIOUS DAMAGE!**

9. During the winter months, gear-reducer lubricants will thicken when exposed to cold weather during shipment. Allow the machine to warm up to room temperature for 8 hours (minimum) before attempting to operate the machine. **FAILURE TO DO THIS MAY RESULT IN BLOWN FUSES OR AC V/F DRIVE FAULTS!**
10. If the machine is loaded by forklift truck, it is recommended that a stop block be mounted to the floor in order to **prevent the lift truck from colliding with the turntable**. (Suggestion: A 3" x 3" x 1/2" thick steel angle bolted to the floor.)
11. **READ THE MANUAL!**

2:0 SPECIFIC CAUTIONS AND WARNINGS

In the interest of promoting safe operating practices in the use of this equipment, cautionary references are made throughout this manual in the format shown below.

- **NOTICE!**

*This designation indicates that a failure to observe can cause **EQUIPMENT MALFUNCTION!***

- **CAUTION!**

*This designation indicates that a failure to observe can cause **DAMAGE TO THE EQUIPMENT!***

- **WARNING!**

*This designation indicates that failure to observe can cause **DAMAGE TO THE EQUIPMENT AND / OR INJURY TO PERSONNEL!***

We strongly recommend that all personnel involved in operating and maintaining this equipment be fully trained in the operational and maintenance procedures described in this manual, and that this manual be kept accessible to those personnel as a source of reference information.

Cousins Packaging Inc. endeavors to manufacture the safest equipment possible. Our intention to provide only safe, quality packaging equipment to our customers is enhanced by our on-going Product Safety program.

Cousins Packaging has no means of controlling the safe use of our equipment other than through the features designed and built into our machinery and the recommendations made in this manual. **Ultimately the end-user must assume final responsibility for the safety performance of this equipment and for maintaining a safe working environment!**

3:0 MACHINE DESCRIPTION

The LP-SRT stretch-wrapping machine is a floor level, (3" turntable elevation), unit designed to be loaded either by fork-truck, or by a pallet jack or power-walkie in conjunction with an optional access ramp. The machine operates on 115 volt 15 amp electrical service.

The HP-SRT stretch-wrapping machine is a high-profile unit, designed to be loaded by forklift truck. The machine operates on 115 volt 15 amp electrical service. Both machines accept all commercial stretch films to 1.2 mils thick, 10 inches in roll diameter, up to 20 inches web height..

3:1 Machine Specifications

3:1:1 LP-SRT Low Profile

Power	115 volt, 1 Phase, 15 Amp (unshared) line service required. A 14 gauge power cord complete with a 115 volt 15 Amp 2-pole 3-wire grounding type plug is provided.
Control	The machine is controlled by microprocessor with integral Operator Interface Panel (HMI).
Motors	All motors, unless otherwise specified, are 230 volts 3 phase, TEFC, fractional to 1/2 HP.
Speed	<p>Turntable speed is manually controlled from 0 to 12 rpm, by adjustment of a speed setting parameter on the Operator Interface Panel (HMI).</p> <p>The Film Carriage elevator speed is manually controlled from minimum stall to maximum speed by keypad buttons located on the control panel door. Separate speed adjustment is provided for Raise and Lower speeds.</p>
Turntable	<p>The LP-SRT Turntable is driven from a right-angle oil-filled gear-reducer and ANSI #50 direct chain drive. A center A-type sprocket connects to the turntable using four 1/2" bolts.</p> <p>The Film Carriage elevator is driven from a right-angle oil-filled gear-reducer and ANSI #40 direct chain drive complete with shock absorption mechanism that incorporates an "anti-fall"</p>

safety mechanism to safeguard the operator and the equipment in the unlikely event of a chain failure.

Environment	The LP-SRT Low Profile Platform Automatic stretch wrapper is designed for standard industrial environments with operating temperature ranging from +55°F to +120°F. Operation in cooler environments requires a Cold Weather or Freezer Package Option.
Capacity	Loading of 4,500 pounds turning, and 10,000 pounds static. Standard design for pallet loads up to 50" square (71" maximum diagonal dimension), to 80" overall height.
Film	The LP-SRT Low Profile Platform Automatic accepts film wound on a standard 3" core with a roll diameter of 10" maximum and a 20" maximum web height.

3:1:2 HP-SRT High Profile

Power	115 volt, 1 Phase, 15 Amp (unshared) line service required. A 14 gauge power cord complete with a 115 volt 15 Amp 2-pole 3-wire grounding type plug is provided.
Control	The machine is controlled by microprocessor with integral Operator Interface Panel (HMI).
Motors	All motors, unless otherwise specified, are 230 volts 3 phase, TEFC, fractional to 1/2 HP.
Speed	<p>Turntable speed is manually controlled from 0 to 12 rpm, by adjustment of a speed setting parameter on the Operator Interface Panel (HMI).</p> <p>The Film Carriage elevator speed is manually controlled from minimum stall to maximum speed by keypad buttons located on the control panel door. Separate speed adjustment is provided for Raise and Lower speeds.</p>
Drive Train	<p>The HP-SRT Turntable is driven from a right-angle oil-filled gear-reducer and ANSI #50 direct chain drive. A center B-type sprocket connects to the turntable using a keyed shaft & pin arrangement.</p> <p>The Film Carriage elevator is driven from a right-angle oil-filled gear-reducer and ANSI #40 direct chain drive complete with shock absorption mechanism that incorporates an "anti-fall"</p>

safety mechanism to safeguard the operator and the equipment in the unlikely event of a chain failure.

- Environment** The HP-SRT High Profile Platform Automatic stretch-wrapper is designed for standard industrial environments with operating temperature ranging from +55°F to +120°F. Operation in cooler environments requires a Cold Weather or Freezer Package Option.
- Capacity** Loading of 4,500 pounds turning, and 10,000 pounds static. Standard design for pallet loads up to **50"** square (71" maximum diagonal dimension), to 80" overall height.
- Film** The HP-SRT High Profile Platform Automatic accepts film wound on a standard 3" core with a roll diameter of 10" maximum and a 20" maximum web height.

4:0 INSTALLATION

4:1 Moving the Machine

4:1:1 Low Profile

The LP-SRT may be fork-truck lifted from either the front or rear. Simply insert the lift truck forks into the machine base frame channels at either end, being careful not to hit the tower when tilting, if lifting from the tower side of the machine.

4:1:2 High Profile

The HP-SRT is a portable machine and may be fork-truck lifted from either front or rear. Simply insert the lift truck forks into the machine base frame tubes at either end, being careful not to hit the tower when tilting, if lifting from the tower side of the machine.

4:2 Unpacking and Inspection

Before applying power or operating the machine, a general inspection is recommended to determine if any damage has taken place during transport.

IT IS THE END-USER'S RESPONSIBILITY TO REPORT ANY DAMAGE INCURRED DURING SHIPMENT TO THE TRUCKING COMPANY!

In order to obtain a clear view of all elements of the machine, carefully remove all packaging, strapping and blocking materials, as well as any shipping bolts.

4:2:1 LP-SRT Low Profile

1. Remove any strapping around the top of the turntable, securing it to the machine base. Rotate the turntable clockwise and counter-clockwise manually. Determine if the rolling action is both smooth and quiet.
2. Locate the optional ramp to the desired position. Ensure that the mounting flanges on the ramp align with the corresponding holes on the machine base. Insert the ramp mounting bolts, washers and lock-washers and tighten securely.
3. Inspect visible cables and conduit for crushed sections or loose fittings and ensure that they are routed correctly and will not snag on anything.

4. Actuate the Film Carriage Descent Obstruction Plate upwards and then release, to ensure that the safety stop plate mechanism and safety switch assembly are functioning correctly. (Refer to Section 9:15)

• **WARNING!** *Failure to thoroughly test the operation of the Carriage Safety Switch may render the safety feature inoperable!*

5. Operate all control panel push-buttons and switches. Their actions should be crisp and free.
6. Check the carriage limit switch lever arms to ensure that they will contact the limit switch strikers. Ensure that the upper and lower limit switch strikers are positioned above and below the film carriage limit switches, respectively.

• **CAUTION!** *The film carriage limit switches must operate between the upper and lower limit switch strikers to safely limit the travel of the film carriage!*

4:2:2 HP-SRT High Profile

1. Inspect the underside of the turntable for evidence of impact or crippling of caster supports, center axle, or drive assembly.
2. Inspect visible cables and conduit for crushed sections or loose fittings and ensure that they are routed correctly and will not snag on anything.
3. Actuate the Film Carriage Descent Obstruction Plate upwards and then release, to ensure that the safety stop plate mechanism and safety switch assembly are functioning correctly. (Refer to Section 9:15)

• **WARNING!** *Failure to thoroughly test the operation of the Carriage Safety Switch may render the safety feature inoperable!*

4. Operate all control panel push-buttons and switches. Their actions should be crisp and free.
5. Check the carriage limit switch lever arms to ensure that it will contact the limit switch strikers. Ensure that the upper and lower limit switch strikers are positioned above and below the carriage limit switches, respectively.

- **CAUTION!** *The film carriage limit switches must operate between the upper and lower limit switch strikers to safely limit the travel of the film carriage!*

4:3 Extended Tower Assembly (Optional)

Machines equipped with an extended tower will be shipped in “knocked-down” condition. The tower is hinged where it attaches to the machine base and will be folded down at an angle for shipment, supported by a shipping bracket and tower brace.

4:3:1 LP-SRT Fold-Down Tower

Assemble the tower to the machine as follows:

1. Remove all packaging from the machine.
2. Round up the necessary personnel and a crane, forklift truck or other lifting device with which to raise the tower.
3. Attach a sling or cable through the lifting / shipping support bracket at the top of the tower. Lift the tower slightly until the lifting device takes up the weight, and then remove the lower shipping bracket and support brace from the front of the machine.

- **WARNING!** *At this stage the tower is not secured to the machine base, from this point onward exercise **extreme caution** that the tower does not fall or topple forwards, at its pivot point!*

4. Pivot the tower upward such that it is resting flat on to the machine base. As viewed from the rear of the machine, install the 1/2” – 13 - 1 1/4” flat head bolt from the bottom, through the right rear non-threaded hole in the base frame weldment and tower base weldment and secure it with the 1/2” – 13 nut and lock-washer provided. Then install the two 1/2” – 13 – 1 1/2” hex head bolts and lock-washers provided into the threaded holes and ensure that all hardware is securely fastened before proceeding. **Be careful not to pinch the cable(s) located at the hinged section of the tower!**
5. Manually jog the turntable through two complete revolutions, to verify that the turntable drive chain tension is correct, (readjust if required).
6. Replace / install and securely fasten down the tower top cover.

7. Test for proper machine operation.

4:3:2 HP-SRT Fold-Down Tower

Assemble the tower to the machine as follows:

1. Remove all packaging from the machine.
2. Remove the tower top cover retainer bolt and tower top cover, (the tower top cover, may not be installed at time of shipment and may be loose shipped).
3. Round up the necessary personnel and a crane, forklift truck or other lifting device with which to raise the tower.
4. Attach a sling or cable through the lifting / shipping support bracket at the top of the tower. Lift the tower slightly until the lifting device takes up the weight, and then remove the lower shipping bracket and support brace from the front of the machine.

- | |
|--|
| <ul style="list-style-type: none"> • <u>WARNING!</u> <i>At this stage the tower is not secured to the machine base, from this point onward exercise <u>extreme caution</u> that the tower does not fall or topple forwards, at its pivot point!</i> |
|--|

5. Pivot the tower upward such that it is resting flat on to the machine base and then fasten it down securely, using the three 1/2" –13 X 1 1/2" bolts and washers provided. **Be careful not to pinch the cable(s) located at the hinged section of the tower!**
6. Replace and securely fasten down the tower top cover.
7. Test for proper machine operation.

4:4 Pre-Operation Check and Final Assembly

1. Visually check all chains for proper tension and alignment.
2. Check the film carriage limit switch lever arms to ensure that they will contact their respective limit switch strikers. Ensure that the upper and lower limit switch strikers are positioned above and below the film carriage limit switch lever arms, respectively.

- **CAUTION!** *The film carriage limit switches must operate between the upper and lower limit switch strikers to safely limit the travel of the film carriage!*

3. Operate all control panel push-buttons and switches. Their actions should be crisp and free. Open the control panel and verify that all the Master Control Relay is properly seated in its socket.
4. Turn on the Control Power by pulling out the red mushroom head E-Stop button on the control panel and turning the Power Off–On–Reset switch to the RESET position momentarily.
5. Manually jog the stretch wrap machine turntable through one revolution, to ensure that it is unobstructed.
6. Before wrapping the first load, manually jog the film carriage up and down to ensure that it stops properly at the top and bottom limits.

4:5 General Power Requirements

Unless otherwise specified, the machine requires a 115 volt, 1 Phase, 60 Hz., 15 Amp (unshared) line service.

- **CAUTION!** *Power the system only from an adequately fused wall socket of the correct voltage. Do not use an extension cord as a severe line power drop may occur, resulting in damage to the electronic circuits!*

If it is necessary to use an extension cord temporarily, a #12 AWG (minimum) grounded type flexible cord to a maximum length of 10 feet would be acceptable. **However, this is not recommended for permanent service.**

The available line service voltage should be verified with a voltmeter at the machine terminal strip, while the machine is operating under load, in order to determine if the service is adequate.

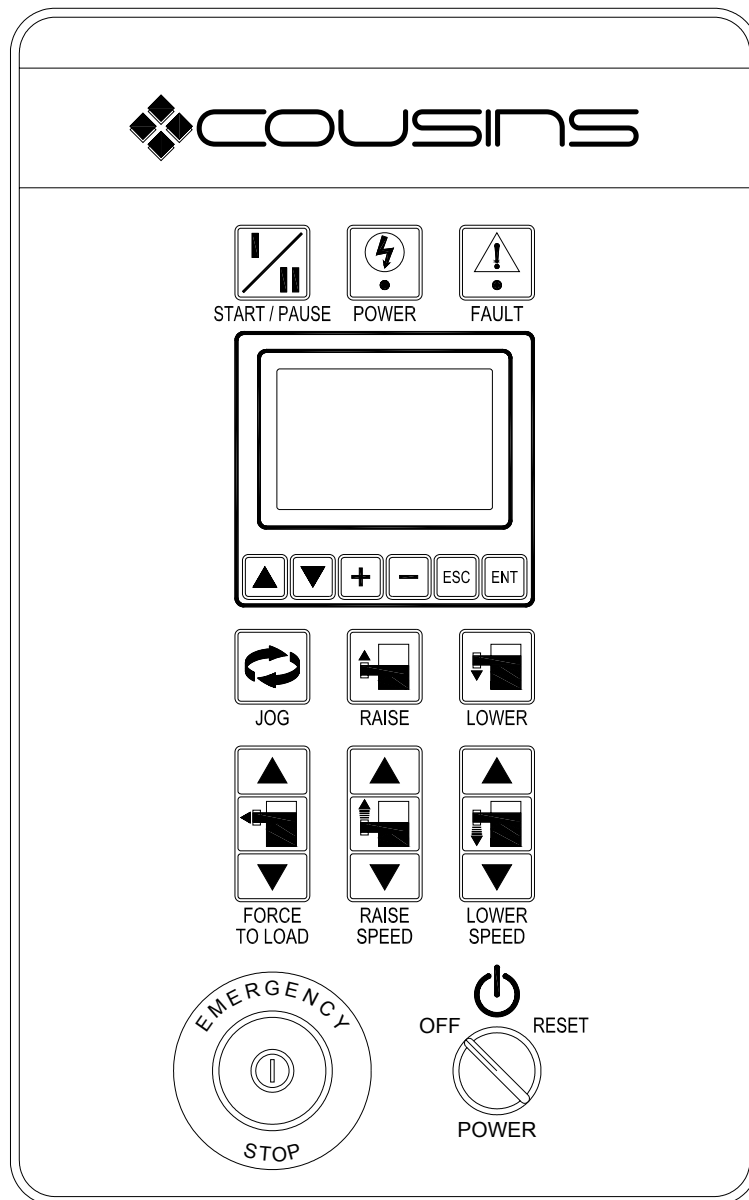
The line voltage should not drop below 109 volts AC during full load operation!

The line voltage should not exceed 126 volts AC at any time!

5:0 SET-UP AND OPERATING PROCEDURES

5:1 Operating Controls – Exterior Control Panel

This section provides a description of the operator controls located on the exterior panel of the control enclosure. The front bezel or label incorporates an Operator Interface Panel (HMI) and various membrane type keypad buttons in addition to an Emergency Stop push-pull button and a Power-On-Reset selector switch.



5:1:1 Main Disconnect Switch (Optional)

The optional Main Disconnect switch is used to disconnect the incoming power from the control and motor circuits. In the “**O**” (Off) position, power is disconnected. In the “**I**” (On) position power is connected. Holes in the operating handle of the Main Disconnect Switch allow for the installation of a padlock when the switch is turned to the “**O**” (Off) position.

5:1:2 Emergency Stop Push-Pull Button

This two-position red mushroom-head push-pull button is used to disable the control power and the Master Control relay. When pulled out, control power is made available to the Master Control Relay (MCR). Pushing the Emergency Stop button in will interrupt power to the control and motor circuits and causes all machine functions to come to an immediate halt.

- **WARNING!** *The interior of the control panel remains powered even when the Emergency Stop button is pushed in to the **STOP** position. **ALWAYS disconnect power before opening the control panel!***

5:1:3 Power Off–Reset Selector Switch

This three-position selector switch is used to turn on the control power. When turned to the <**RESET**> position, the control power is reset and is indicated by the illumination of the blue POWER ON light. When released, the switch will spring back from this position to the center position. Turning the switch to the <**OFF**> position will interrupt power to the control and motor circuits and causes all machine functions to come to an immediate halt.

- **WARNING!** *The interior of the control panel remains powered even when the power switch is turned **OFF**. **ALWAYS unplug the machine before opening the control enclosure!***

5:1:4 Wrap Cycle START/PAUSE Keypad Button

This green <**START/PAUSE**> button on the keypad performs the following functions:

1. Pressing this button, (providing the machine is not already performing a wrap cycle), starts the wrap cycle. All machine functions will progress in proper order automatically without further input from the operator.
2. Pressing this button while the machine is already performing a wrap cycle causes the wrap cycle to go into a PAUSE state and all machine motion to come to a halt. The Wrap Cycle Pause condition is indicated by a message on the Operator Interface Panel (HMI). Pressing this button again will allow the wrap cycle to resume.

5:1:5 Turntable JOG Keypad Button

The blue <**JOG**> button, when pressed, causes the turntable to rotate at slow speed. This function automatically stops when the button is released.

5:1:6 Film Carriage Elevator RAISE Keypad Button

Pressing the blue <**RAISE**> button, causes the film carriage to ascend. This function automatically stops when the film carriage upper limit switch comes in contact with the upper limit striker, or when the button is released.

5:1:7 Film Carriage Elevator LOWER Keypad Button

Pressing the blue <**LOWER**> button, causes the film carriage to descend. This function automatically stops when the film carriage bottom limit switch comes in contact with the lower limit striker, or when the button is released.

5:1:8 Film Carriage RAISE SPEED Keypad Buttons

The <**RAISE SPEED**> keypad buttons provide adjustment of film overlap by varying the film carriage elevator motor speed while it is ascending. This is adjustable from a slow crawl at <0> to a maximum speed to suit up to 20" wide film. Pressing the orange <**UP**> arrow symbol keypad button increases the value between <0> and <10>. Pressing the orange <**DOWN**> arrow symbol keypad button decreases the value.

5:1:9 Film Carriage LOWER SPEED Keypad Buttons

The <**LOWER SPEED**> keypad buttons provide adjustment of film overlap by varying the film carriage elevator motor speed while it is descending. This is adjustable from a slow crawl at zero to a maximum speed to suit up to 20” wide film. Pressing the orange <**UP**> arrow symbol keypad button increases the value between <**0**> and <**10**>. Pressing the orange <**DOWN**> arrow symbol keypad button decreases the value.

5:1:10 Film FORCE TO LOAD Control Keypad Buttons

The <**FORCE TO LOAD**> setting, (sometimes referred to as “Film Tension”), controls the output speed of the film web and is variable from a setting of zero, (maximum film output speed), to values usually capable of breaking the stretch-wrap material. Pressing the orange UP arrow keypad button increases the value between <**0**> and <**10**>. Pressing the orange <**UP**> arrow symbol keypad button increases the value between <**0**> and <**10**>. Pressing the orange <**DOWN**> arrow symbol keypad button decreases the value.

- **NOTICE!** *Film economy is determined by the **Super Rapid Thread II™** prestretch system’s prestretch ratio. The Force to Load setting controls the tightness of the film web as it is delivered to the load only. Most films will continue to tighten on the package for several hours after wrapping due to film “memory”.*

This should be adjusted to a setting where the prestretch dancer roller mechanism is able to “float” between its stops. In this way the **Super Rapid Thread II™** prestretch system can vary the output speed of the film web in order to compensate for the corners of the load as it rotates, and thereby maintain a constant level of tightness to the load.

5:1:11 POWER Indicator Light

This blue LED indicator light will be illuminated whenever the control power is enabled and the Master Control Relay (MCR) is energized. This must be illuminated in order for the machine to operate.

5:1:12 FAULT Indicator Light

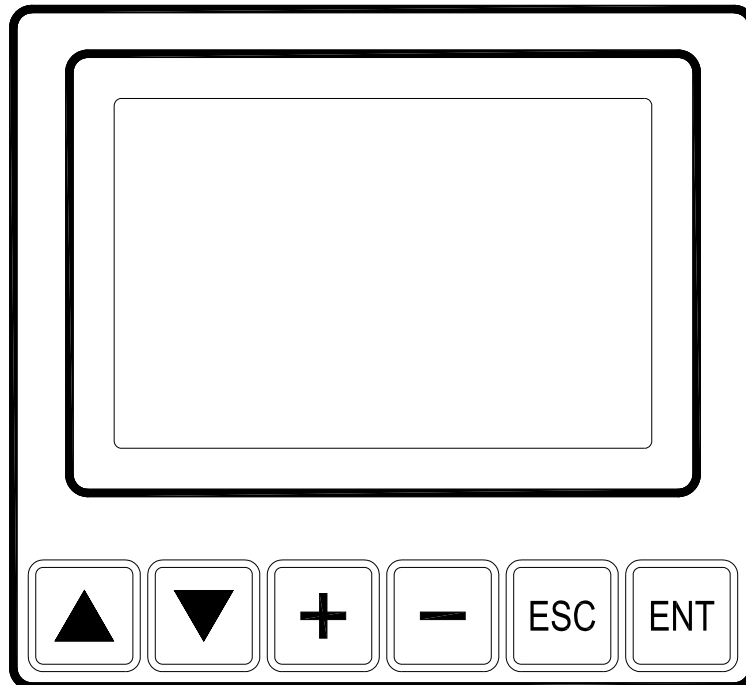
This red LED indicator light will flash whenever a fault condition has been detected. Refer to information displayed on the Operator Interface Panel (HMI) screen to determine the necessary action(s) required to correct the fault and return to operating mode. Refer to Section 10:1 for a list of machine fault conditions.

5:2 Operator Interface Panel (HMI)

Switch series machines are equipped with an Operator Interface Panel, also referred to as an HMI (Human-Machine Interface). The Operator Interface Panel is integral to the machine's microprocessor control circuit board.

The Operator Interface Panel interfaces with the machine's microprocessor control system to display diagnostic messages, machine status messages, and to access a menu system in which the machine presets and wrapping parameters can be accessed and modified.

The Operator Interface Panel (HMI) is equipped with a row of six Function Key Buttons located below the LCD screen that are used to navigate between displayed options, increment variable parameters and enter or select the desired value or function.



The <**UP**> and <**DOWN**> arrow symbol keypad buttons are used to move the cursor (>) vertically between lines on the displayed screen. The line that the cursor is on will be displayed with a dark background to highlight that it is the currently active selection. Holding these buttons down will cause them to scroll continuously.

The <**PLUS**> and <**MINUS**> symbol keypad buttons are used to increment or decrement numeric values or switch between defined states, depending on the item selected. Holding these buttons down will cause them to scroll continuously.

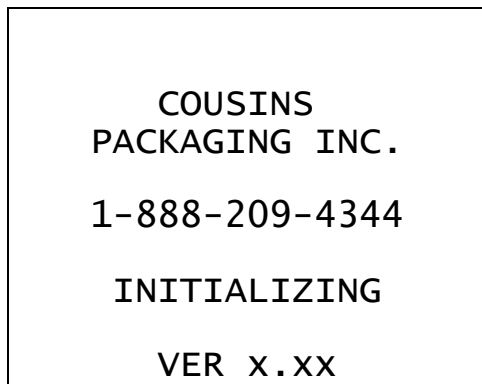
The <ESC> (Escape) keypad button is used to “escape” from the current screen back to the previous screen.

The <ENT> (Enter) keypad button is used to select the currently high-lighted item and perform the function indicated on that line. It is not necessary to press the <ENT> button to enter numeric values or states if the <ESC> button is used to navigate away from the screen where a variable value has been modified.

The Operator Interface Panel (HMI) is an LCD display with LED back-lighting. After a period of inactivity the HMI will go into a screen-saver mode and the back-light will turn off. Pressing on any keypad button or starting a wrap cycle will re-enable the back-light.

5:2:1 Initialization Screen

When the machine is first plugged in an initialization screen is displayed briefly. This will disappear within a few seconds.



Screen #1 – Initialization Screen

5:2:2 Control Power Disabled Screen

The **CONTROL POWER DISABLED** screen is displayed whenever power is connected and the Master Control Relay (MCR) is disabled. Follow the displayed instructions on this screen to re-enable the control power.

CONTROL POWER
DISABLED!

CLOSE THE RAPID
THREAD DOOR AND
PULL OUT THE E-STOP
BUTTON, THEN TURN
THE POWER SWITCH
TO <RESET> TO
RE-ENABLE THE POWER.

Screen #2 – Control Power Disabled Screen

5:2:3 Start-up Splash Screen

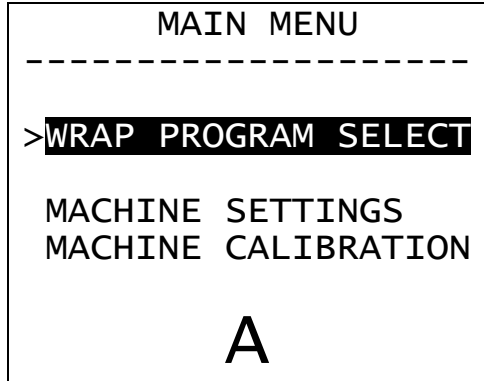
The Start-up Splash screen appears briefly after the control power is turned on. Once the control power has been enabled the Start-up Splash Screen will not reappear unless the control power has been disabled for a minimum of 1 minute.

COUSINS
PACKAGING INC.
SWITCH SERIES

Screen #3 – Start-up Splash Screen

5:2:4 Main Menu Screen

The **MAIN MENU** screen is the default screen that will appear after the control power is enabled and the Start-up Splash Screen has timed-out. The Main Menu Screen has four selections for navigation to other screens where machine functions and settings can be selected and modified. Use the <UP> and <DOWN> arrow symbol buttons to move the cursor (>) to the appropriate line, then press the <ENT> button to make the desired selection.

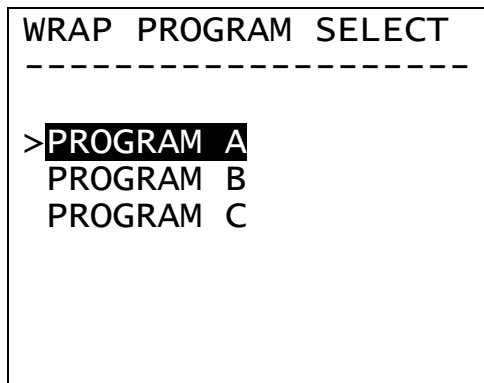


Screen #4 – Main Menu Screen

A large letter <A>, , or <C> is displayed at the bottom of the Main Menu screen to indicate the currently selected Wrap Program (refer to Section 5:2:4).

5:2:4:1 Wrap Program Select Screen

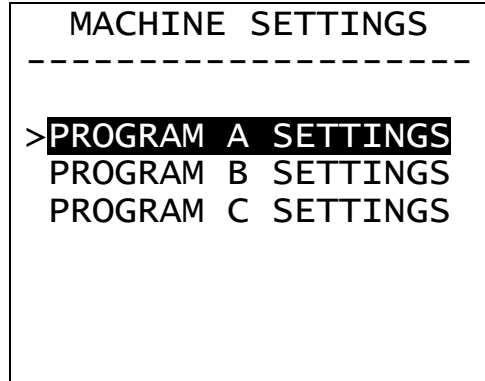
The **WRAP PROGRAM SELECT** screen, accessed from the **MAIN MENU** screen, has three lines that are used to select Wrap Program A, Wrap Program B, or Wrap Program C. When a wrap cycle is started, the machine will perform the pre-programmed wrap cycle using the parameters stored in the selected program. A letter <A>, , or <C> representing the selected wrap program will be displayed at the bottom of the Main Menu screen.



Screen #5 – Wrap Program Select Screen

5:2:4:2 Machine Settings Screen

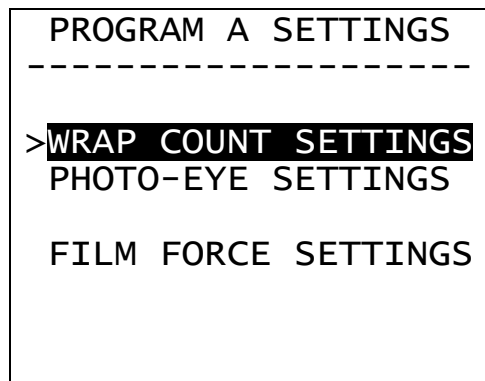
The **MACHINE SETTINGS** screen, accessed from the **MAIN MENU** Screen, has three links that are used to navigate to the Wrap Program A, Wrap Program B, or Wrap Program C Settings screens where the unique machine presets and wrapping parameters for each wrap program can be accessed and modified.



Screen #7 – Machine Settings Screen

Use the <UP> and <DOWN> arrow symbol keypad buttons to move the cursor (>) vertically to the desired A, B or C Program Settings line, then press the <ENT> (Enter) keypad button to go to the selected Program Settings screen.

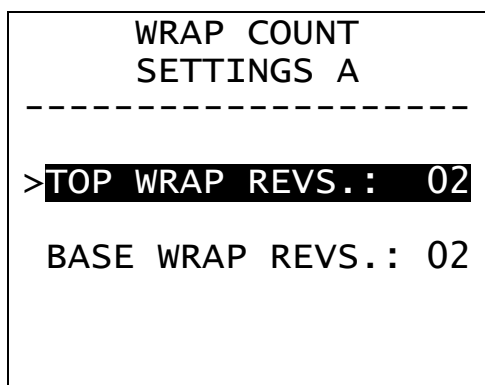
The **PROGRAM A** (or **B** or **C**) Machine Settings screens have four links that are used to navigate to other screens where machine presets and wrapping parameters can be accessed and modified. The Program A Settings screen is shown below. The Program B and C Settings screens are identical.



Screen #8 – Program A Settings Screen

5:2:4:2:1 Wrap Count Settings A (or B or C) Screen

This screen is used to set the number of wrap revolutions that will be applied to the base and top of the load during the wrap cycle. The Wrap Count Settings A screen is shown below. Wrap Count Settings B and C screens are identical.



Screen #9 – Wrap Count Settings A Screen

5:2:4:2:1.1 *Top Wrap Revolutions Setting*

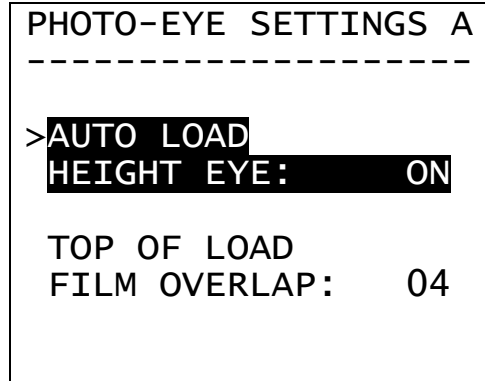
The **TOP WRAP REVS.** setting is used to program the number of wrap revolutions that will be applied to the top of the load during the wrap cycle. To adjust the Top Wrap Revolutions preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A Top Wrap Revolution preset value from <1> to <12> can be entered.

5:2:4:2:1.2 *Base Wrap Revolutions Setting*

The **BASE WRAP REVS.** setting is used to program the number of wrap revolutions that will be applied to the bottom of the load during the wrap cycle. To adjust the Base Wrap Revolutions preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A Base Wrap Revolution preset value from <1> to <12> can be entered.

5:2:4:2:2 *Photo-Eye Settings A (or B or C) Screen*

This screen is used to enable or disable the Auto Load Height Sensing Photo-eye (when operating in semi-automatic mode) and to adjust the amount of film that will overlap the top of the load. Photo-Eye Settings A screen is shown below. Photo-Eye Settings B and C screens are identical.



Screen #10 – Photo-Eye Settings A Screen

5:2:4:2:2.1 Auto Load Height Photo-Eye Off / On Selection

The **AUTO LOAD HEIGHT EYE** selection is used to toggle the Auto Load Height Sensing Photo-Eye parameter **<ON>** or **<OFF>**. This only affects the operation of the machine when operating in semi-automatic mode. (Refer to Section 5:10:1)

In most cases it is desirable to set this to the **<ON>** state, which allows the machine to automatically adjust for varying load heights. Adjust the upper limit switch striker to its highest position when using the Auto Load Height Photo-Eye. (Refer to Section 5:10)

In the event that it becomes necessary to adjust the film carriage elevator height manually, (due to uneven load top layer, voids in the load or photo-eye malfunction), set this to the **<OFF>** state and adjust the upper limit switch striker position manually. (Refer to Section 5:9)

To modify the Auto Load Height Sensing Photo-Eye setting, move the cursor (**>**) to this line and then use the **<PLUS>** or **<MINUS>** symbol keypad buttons to toggle the value between **<ON>** and **<OFF>**.

5:2:4:2:2.2 Top of Load Film Overlap Setting

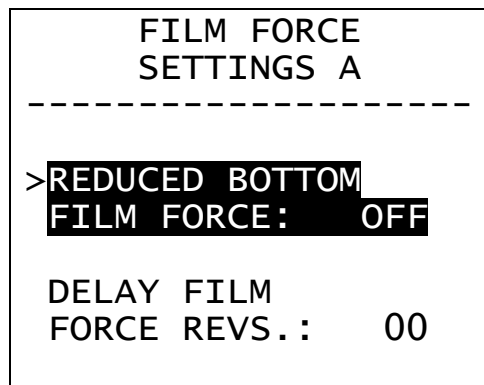
The **TOP OF LOAD FILM OVERLAP** setting is used to preset the amount of film that will overlap the top of the load.

During the wrap cycle, after the Auto Load Height Sensing Photo-Eye (1PE) detects the top of the load, pulses from the Carriage Height Pulse Sensor (5PX) are counted until the number of pulses counted is equal to the distance represented by the Top of Load Film Overlap value, at which time the film carriage elevator stops ascending.

This parameter is adjustable from a minimum value of 0 inches to a maximum value of 20 inches. To adjust the Top of Load Film Overlap preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A preset value from <0> to <20> can be entered.

5:2:4:2:3 Film Force Settings A (or B or C) Screen

This screen is used to enable or disable the Reduced Bottom Film Force parameter, and to adjust the number of Delayed Film Force Revolutions that will be counted at the start of the wrap cycle before enabling the Force to Load setting. Film Force Settings A screen is shown below. Film Force Settings B and C screens are identical.



Screen #12 – Film Force Settings A Screen

5:2:4:2:3.1 *Reduced Bottom Film Force Selection*

The **REDUCED BOTTOM FILM FORCE** selection is used to toggle the Reduced Bottom Film Force parameter <ON> or <OFF>.

Loads with protruding pallet corners may cause the film to break when wrapping the base of the load. By reducing the Film Tension (Force to Load) while the base of the load is being wrapped, this can be averted.

When the Reduced Bottom Film Force parameter is set to the <ON> state, and the film carriage has reached its bottom limit after descending from the top of the load, the Force To Load setting on the keypad is disabled. Once the base wrap revolutions are complete and the film carriage has ascended clear of the pallet, the Force To Load setting will be re-engaged and film will be applied to the load at the selected value for the duration of the wrap cycle.

To modify the Reduced Bottom Film Force setting, move the cursor (>) to this line and then use the <**PLUS**> or <**MINUS**> symbol keypad buttons to toggle the value between <**ON**> and <**OFF**>.

5:2:4:2:3.2 *Delayed Film Force Revolutions Setting*

The **DELAY FILM FORCE REVS.** setting is used to program the number of wrap revolutions that will be counted at the beginning of the wrap cycle before the keypad Force To Load setting is enabled.

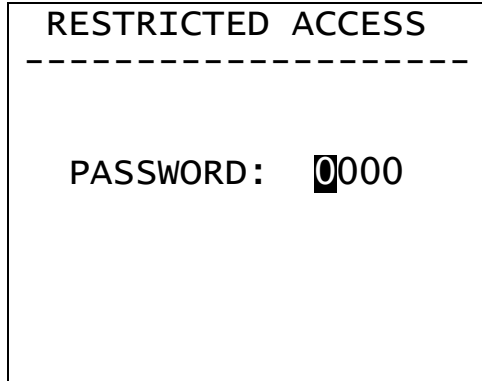
Lightweight loads may tend to slide or topple due to the dragging effect of the film, during the initial revolutions of the wrap cycle. By using the Delayed Film Force Revolutions parameter to reduce the Film Tension (Force To Load) for a preset number of revolutions, the load can be effectively stabilized during the initial revolutions of the wrap cycle. Once the preset number of turntable revolutions have been counted, the Force To Load setting will be engaged and film will be applied to the load using the keypad Force To Load value for the remainder of the wrap cycle.

This parameter is adjustable from a minimum value of 0 to a maximum value of 9 revolutions. To adjust the Delayed Film Force Revolutions preset value, move the cursor (>) to this line and then use the <**PLUS**> or <**MINUS**> symbol keypad buttons to increment or decrement the value. A preset value from <**0**> to <**9**> can be entered.

5:2:4:3 *Calibration Settings Screen*

The **CALIBRATION SETTINGS** screen, accessed from the **MAIN MENU** screen, is used to set the parameters related to the overall calibration of the machine. Values entered in the Calibration Settings are used for all wrap programs.

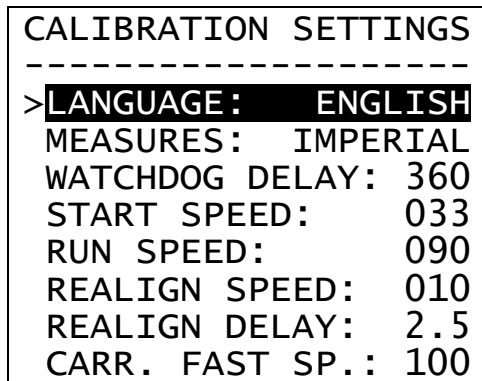
In order to prevent unauthorized personnel from adjusting critical operating parameters, access to the Calibration Settings screen is password protected. When the **CALIBRATION SETTINGS** line is selected on the **MAIN MENU** screen, the **RESTRICTED ACCESS** screen will appear, and correct entry of a password in this screen is required before the Calibration Settings screen can be displayed.



Screen #13 – Password Entry Screen

A factory standard password of <2100> is used for Switch series machines.

Use the <UP> and <DOWN> arrow symbol keypad buttons to move the cursor horizontally between the digits of the password. The digit that the cursor is on will be displayed with a dark background. Use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the individual password digit values. Once the correct password has been entered press the <ENT> button to accept the password entry. If the correct password was entered the **CALIBRATION SETTINGS** screen will be displayed. If an incorrect password is entered the **MAIN MENU** screen will be displayed.



Screen #14 – Calibration Settings Screen

5:2:4:3:1 Language Selection

The **LANGUAGE** selection is used to set the Language displayed on the Operator Interface (HMI) display screen.

To adjust the Language selection, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to scroll through the available languages.

5:2:4:3:2 Measures Selection

The **MEASURES** selection is used to set the units of measure affecting certain parameters related to distance.

To adjust the Measures selection, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to scroll through the available units of measure.

5:2:4:3:3 Wrap Cycle Watchdog Timer Setting

The **WATCHDOG DELAY** setting is used to set the Wrap Cycle Watchdog timer preset value.

All the while the wrap cycle is in progress (except during a Cycle Pause request or a Film Carriage Pause / Reinforce Wrap request), the Wrap Cycle Watchdog timer in the PLC records the elapsed cycle time. If the elapsed cycle time reaches the preset value in the timer, the wrap cycle will immediately be aborted and a fault message will be displayed. The timer's preset value is factory set to 360 seconds (6 minutes).

This parameter is adjustable from a minimum value of 100 to a maximum value of 990 seconds. To adjust the Wrap Cycle Watchdog Timer preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A preset value from <100> to <990> can be entered.

5:2:4:3:4 Turntable Start Speed Setting

The **START SPEED** setting is used to preset the Turntable Start Speed value. The Turntable Start Speed setting is used in two situations, depending on wrap parameter selection, as follows:

1. If the A-Arm Top Safety Scan Revolution parameter is selected <ON> (refer to Section 5:2:4:3:3.1), the turntable will operate at the Start Speed setting during the first revolution of the wrap cycle.
2. If a value higher than <0> is entered in the Slow Start Revolutions parameter (refer to Section 5:2:4:3:3.7), the turntable will operate at the Start Speed setting for the preset number of revolutions.

This parameter is adjustable from a minimum value of 5 percent to a maximum value of 100 percent of full speed. To adjust the Turntable Start Speed preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A preset value from <5> to <100> can be entered.

5:2:4:3:5 Turntable Run Speed Setting

The **RUN SPEED** setting is used to preset the Turntable Run Speed value. The Turntable Run Speed setting determines the speed that the turntable motor will operate at during the wrap cycle, after any Start Speed revolutions have been counted, and until part way into the final revolution.

Adjustable from 1 to 12 R.P.M. to suit loads of varying stability, it is typically factory preset to 11 R.P.M. (1 revolution every 5-1/2 seconds.)

This parameter is adjustable from a minimum value of 5 percent to a maximum value of 100 percent of full speed. To adjust the Turntable Run Speed preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A preset value from <5> to <100> can be entered.

5:2:4:3:6 Turntable Realign Speed Setting

The **REALIGN SPEED** setting is used to preset the Turntable Realignment Speed value.

The Turntable Realignment Speed setting is only active in the final revolution of an automatic wrap cycle, after the Realign Delay timer has timed-out, and sets the value for the slow speed used to control realignment of the turntable back to the home (starting) position. This is typically factory preset to approximately 1-1/2 R.P.M. Once this is set, it should not require any further adjustment. If the realignment of the turntable ever requires adjustment, refer to Section 9:11 for the correct procedure.

The Turntable Realignment Speed setting is also engaged when manually jogging the turntable.

This parameter is adjustable from a minimum value of 5 percent to a maximum value of 100 percent of full speed. To adjust the Turntable Realign Speed preset value, move the cursor (>) to this line and then use the <PLUS> or <MINUS> symbol keypad buttons to increment or decrement the value. A preset value from <5> to <100> can be entered. The factory default setting is <10>.

5:2:4:3:7 *Turntable Realign Delay Setting*

The **REALIGN DELAY** setting is used to preset the Turntable Realign Delay Timer value.

The Turntable Realign Delay Timer is used to delay the transition from Turntable Run Speed to Turntable Realign (Slow) Speed during the final revolution of the automatic wrap cycle.

By delaying this transition in speed, the amount of time it takes for the turntable to realign back to the home (starting) position is minimized. Refer to the Turntable Positive Alignment Set-Up and Adjustment procedure in Section #9.11 for details on how this timer's preset value should be adjusted.

This parameter is adjustable from a minimum value of 0.0 to a maximum value of 9.9 seconds. To adjust the Turntable Realign Delay preset value, move the cursor (>) to this line and then use the <**PLUS**> or <**MINUS**> symbol keypad buttons to increment or decrement the value. A preset value from <**0.0**> to <**9.9**> can be entered.

5:2:4:3:8 *Film Carriage Elevator Fast Speed Setting*

The **CARR. FAST SPEED** setting is used to preset the Film Carriage Elevator Fast Speed value.

The Film Carriage Elevator Fast Speed setting is used to set the speed that the film carriage elevator motor will operate at when lifting or lowering the A-Arm.

Adjustable from a slow crawl at minimum to 27 feet per minute at maximum, it is typically factory preset to its maximum speed to reduce the amount of time it takes for the A-Arm to find the top of the load at the start of the cycle and to ascend clear of the load at the end of the cycle, thereby reducing cycle time and increasing efficiency.

This parameter is adjustable from a minimum value of 5 percent to a maximum value of 100 percent of full speed. To adjust the Film Carriage Elevator Fast Speed preset value, move the cursor (>) to this line and then use the <**PLUS**> or <**MINUS**> symbol keypad buttons to increment or decrement the value. A preset value from <**5**> to <**100**> can be entered.

5:3 Super Rapid Thread II™ Prestretch Door Safety Switch

An Auto Power Cut-Off Safety Switch is installed on machines equipped with the **Super Rapid Thread II™** Prestretch Carriage.

The purpose of this switch is to disable the machine from operating at any time that the **Super Rapid Thread II™** Safety Door is not in the closed and fully latched position.

The **Super Rapid Thread II™** Door Safety Switch is a coded-magnet type safety switch and is mounted to the underside of the prestretch carriage top plate immediately to the left of the door latch mechanism. The corresponding magnet is mounted to the **Super Rapid Thread II™** Safety Door.

5:4 Turntable Speed Adjustment

The Turntable Run Speed is adjustable from approximately 3 RPM to 12 RPM. Access the Turntable Run Speed setting (refer to Section 5:2:4:4.5) in the **CALIBRATION SETTINGS** screen, then modify the Turntable Run Speed to the desired level.

Cycle the machine to observe the modified setting. Re-adjust as necessary.

5:5 Film Carriage Elevator Speed Set-Up

The LP-SRT and HP-SRT Platform Automatic Stretch-wrappers are equipped with independent speed controls for the film carriage raise and film carriage lower functions.

5:5:1 Film Carriage Elevator Raise Speed

The film carriage elevator raise speed is used to control the amount of overlap between the layers of film while the film carriage is ascending. Adjust the film carriage elevator raise speed using the Film Carriage Raise Speed keypad buttons (refer to Section 5:1:8) until the desired film web overlap is achieved. (A four to six inch overlap between layers is recommended for most applications.)

When operating in semi-automatic mode it is recommended that the film carriage elevator raise speed be adjusted to a fast setting in order to stabilize the top of the load early in the wrap cycle.

5:5:2 Film Carriage Elevator Lower Speed

The film carriage elevator lower speed is used to control the amount of overlap between the layers of film while the film carriage is descending. Adjust the film

carriage elevator lower speed using the Film Carriage Lower Speed keypad buttons (refer to Section 5:1:9) until the desired film web overlap is achieved. (A four to six inch overlap between layers is recommended for most applications.)

5:6 Film Carriage Limit Switch Striker Adjustment

The film carriage is designed to run between the adjustable upper and lower limit switch strikers.

It is not necessary to adjust the position of the upper limit switch striker to suit each different load height because the Auto Load Height Sensing Photo-eye automatically detects the top of the load and stops the film carriage at the correct height. The upper limit switch striker should therefore be located at its highest allowable position to act as an over-ride in the event of photo-eye malfunction or if a load exceeding the wrap height capability of the machine is to be wrapped.

The lower limit switch striker only needs to be adjusted if it is desirable to prevent the film from being applied to the pallet or to provide some roping of the film at the bottom of the load.

- ***CAUTION!*** *When making limit switch striker adjustments, ensure that **at all times** the upper limit switch striker is positioned **ABOVE** the film carriage top limit switch lever arm and that the lower limit switch striker is positioned **BELOW** the film carriage bottom limit switch lever arm. Failing to ensure this may result in the film carriage overrunning its allowable range of travel causing damage to the film carriage drive mechanism!*

To adjust a limit switch striker, use the appropriate size Allen (hex) key to loosen the socket head screws, slide the striker vertically in its track to the desired position and then securely re-tighten the screws.

5:7 Auto Load Height Sensing Photo-Eye Adjustment

The Auto Load Height Sensing Photo-Eye is used to automatically detect the top of the load in order to accommodate varying load heights.

5:8 Film Carriage Descent Obstruction Plate Safety Switch

LP-SRT and HP-SRT Platform Automatic stretch wrap machines are equipped with a Film Carriage Descent Obstruction Plate and Carriage Safety Switch.

The purpose of the Film Carriage Descent Obstruction Plate Safety Switch is to disable the wrap cycle and film carriage elevator lower function in the event that the Descent Obstruction Plate is obstructed, (i.e. by some foreign object located between the bottom of the film carriage and the floor), during the wrap cycle or when the film carriage elevator is being manually lowered using the Film Carriage LOWER keypad button.

When the Film Carriage Descent Obstruction Plate is actuated, the Carriage Safety Switch contacts open, disabling the Automatic Wrap Cycle and film carriage elevator lower function. In the event that the Film Carriage Safety Switch is tripped, this condition will be indicated by the red flashing Fault light and by an error message displayed on the Operator Interface Panel (HMI).

To reset the machine after the film carriage safety switch has been tripped, manually raise the film carriage using the Film Carriage Elevator RAISE keypad button (refer to Section 5:1:6), or cycle the power by turning the Power Off–Reset Switch to the <**OFF**> position and then back to the <**RESET**> position.

6:0 WRAPPING A LOAD

6:1 Placing the Load on the Turntable

Carefully place the load to be wrapped onto the turntable. The best wrap results will be achieved if the loads are positioned evenly in the center of the turntable.

- **WARNING!** *When loading by forklift truck, avoid collisions between the lift truck and the machine structure!*

6:2 Threading the Super Rapid Thread II™ Prestretch

Raise the film carriage to a comfortable height and place a roll of film on the film spindle. Turn the Power Off–Reset Switch to the <OFF> position, and draw approximately four feet of material from the film roll. Twist the film into a rope and thread, as follows:



Attaching the Film to the Film Hook

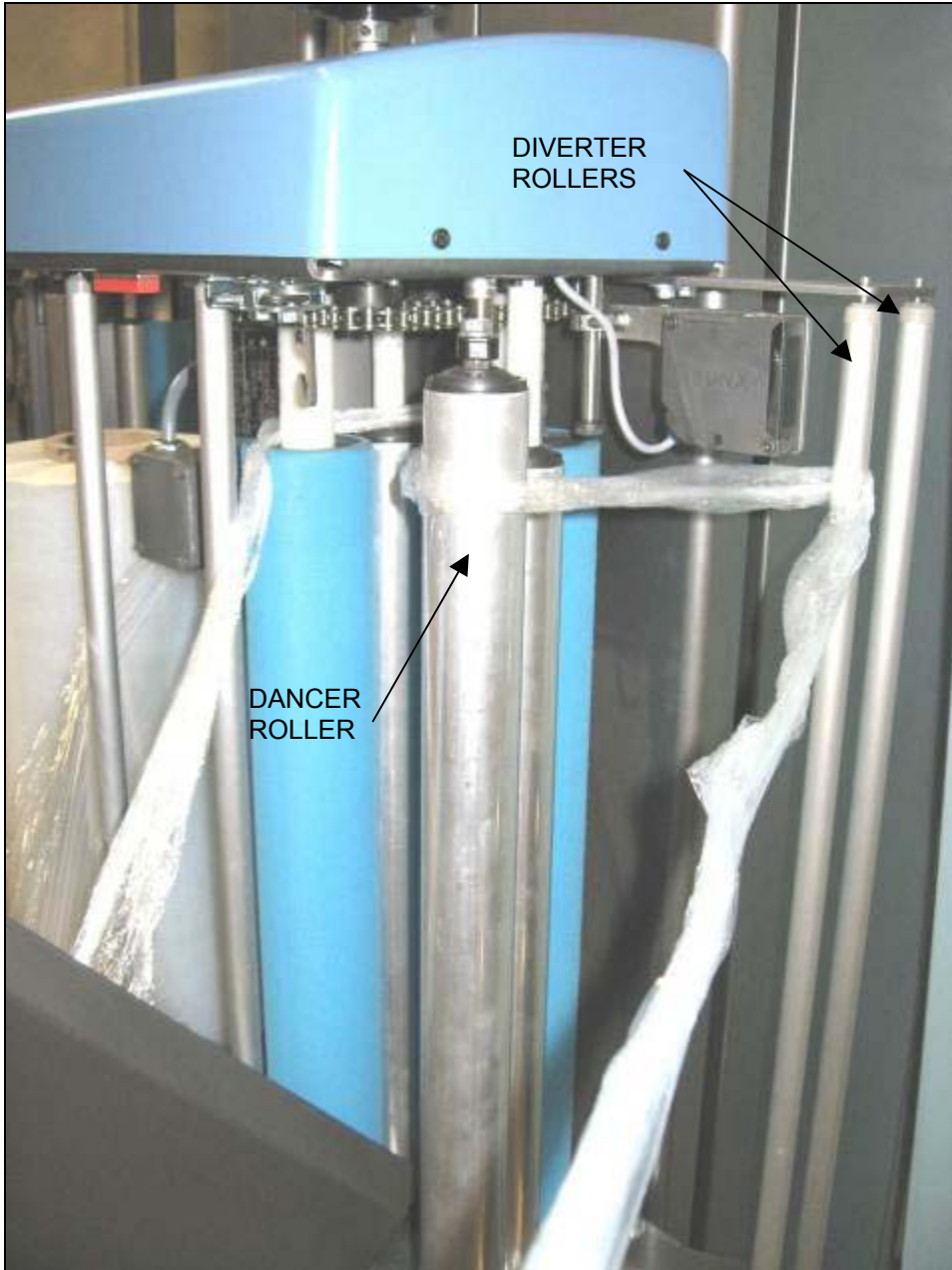
Refer to the preceding illustration and turn the Film Threading Hand-Wheel in a clockwise rotation until the Film Loading Attachment Hook is located in the load position. Next thread the film under and around the **Super Rapid Thread II™** Door Nip / Idler Roller and place the film into the attachment hook.



Threading the Film through the Film Carriage.

Refer to the preceding illustration and turn the Film Threading Hand-Wheel in a clockwise rotation until the Film Loading Attachment Hook has drawn the film through the film carriage and the hook has returned to its starting location.

Refer to the following illustration and remove the film from the film hook, then draw a sufficient length of film through the film carriage to wrap the film around the Dancer Roller and then in between the Diverter Rollers.



Threading the Film around the Dancer Roller & through the Diverter Rollers.

Close the **Super Rapid Thread II™** Film Carriage Loading Door and then turn the Power Off–Reset Switch to the <RESET> position and release the switch to restore control power.

- **WARNING!** **PINCH POINTS** Be careful to keep hands, hair and loose clothing well clear of the polyurethane-coated prestretch rollers and aluminum pinch rollers while power is applied!



Film correctly threaded through the Film Carriage

When control power has been reapplied, gently pull the film towards the turntable. This action will cause the Dancer Roller to pivot and the machine will begin to dispense film, self threading the film across the full length of the Prestretch and Nip / Idler Rollers, (as displayed in the preceding illustration).

6:3 Attaching the Film

Draw approximately three to five feet of material from the **Super Rapid Thread II™** prestretch carriage. Rope the end of the film and attach to any convenient point on the load or pallet.

6:4 Starting the Wrap Cycle (Initial Set-up)

Place the load to be wrapped onto the turntable. (Refer to Section 6:1.)

Set the Top Wrap Revolutions preset value, (refer to Section 5:2:4:3:1.1), Base Wrap Revolutions preset value, (refer to Section 5:2:4:3:1.2), Carriage Raise Speed, (refer to Section 5:1:8) and Carriage Lower Speed, (refer to Section 5:1:9), to the desired values. Turn the Force to Load Control knob to zero. Press the green WRAP CYCLE START push-button momentarily, to start the wrap cycle. As the load rotates, gradually increase the Force to Load setting until the desired film tension level is obtained. This setting should be acceptable for subsequent loads if the length and width of the load do not vary greatly.

- **NOTICE!** *Film economy is determined by the **Super Rapid Thread II™** prestretch system prestretch ratio. The setting of the Force to Load Control knob controls the tightness of the film web as it is delivered to the load only. Most films will continue to tighten on the load for several hours after wrapping due to film “memory”.*

6:5 Wrap Cycle Sequence of Operation

6:5:1 Semi-Automatic Wrap Cycle Sequence

Manually lower the film carriage until it reaches its bottom limit. Set the Top and Base wraps to the desired values. Set the Force to Load and Film Carriage Speed controls to the desired levels. Ensure the film is secured to the load.

1. Press the WRAP CYCLE START / PAUSE button, (refer to Section 5:1:4), momentarily. The turntable will begin to rotate, accelerating to the speed set by the Turntable Run Speed Setting (refer to Section 5:2:4:4:5). At the same time the film carriage will begin to ascend at the speed set by the Carriage Raise Speed Setting, (refer to Section 5:1:9), winding the film around the load in a spiral pattern. (Minor adjustment to the Force to Load setting may be required to adjust the tightness of the film.)

2. When the top of the load is detected by the Auto Load Height Sensing photo-eye (1PE) being unblocked plus the Top of Load Film Overlap Counter preset value having been counted (incremented from pulses produced by the Carriage Height Pulse sensor #5PX), or by the Carriage Top Limit switch (2LS) being reached, the film carriage stops ascending and the top of the load is wrapped.
3. Upon completion of the preset top wrap revolutions (refer to Section 5:2:4:3:1.1), the film carriage will begin to descend at the speed set by the Carriage Lower Speed setting, (refer to Section 5:1:9), winding the film around the load in a spiral pattern across the layers of film previously applied.
4. When the film carriage reaches the Film Carriage Bottom Limit switch (3LS) the film carriage stops descending and the base of the load is wrapped.
5. Upon completion of the preset base wrap revolutions, (refer to Section 5:2:4:3:1.2), less one, the Turntable Realign Delay timer starts and after timing-out, the turntable decelerates to the speed set by the Turntable Realign Speed setting (refer to Section 5:2:4:4:6) prior to aligning with the turntable home position and stopping.

6:6 Re-Wrapping the Load

If a Film Fault (Optional) or other fault condition is detected during the wrap cycle it will probably be necessary to “Re-Wrap” the load.

When this occurs, visually check the machine and the Operator Interface Panel (HMI) to ascertain the nature of the fault. After determining the cause of the fault condition, rectify the problem and ensure that the film is correctly threaded (refer to Section 6:2) and attached to the load, (refer to Section 6:3).

Press the WRAP CYCLE START / PAUSE button, (refer to Section 5:1:4), momentarily to re-start the wrap cycle. All machine functions will progress in proper order automatically without further input from the operator.

7:0 REMEDIAL ADJUSTMENT

7:1 Turntable Soft-Start

Turntable Soft-Start, (or acceleration), is controlled by the turntable Ac Variable Frequency Drive

Turntable start-up speed may be affected by a wide range of load weights and stability factors. If the load twists, distorts, or spills during the first few moments of turntable rotation, this may indicate that the acceleration time is set too low, (refer to Section 9:8).

7:2 Load Toppling or Sliding

Lightweight loads may tend to slide off the turntable or topple due to the dragging effect of the film.

A few modifications may be required in order to achieve satisfactory operation:

1. Increase the Delayed Film Force Revolutions setting (refer to section 5:2:4:3:4.2) to allow the load to be stabilized during the initial revolutions of the wrap cycle.
2. Decrease the Force to Load setting (refer to Section 5:1:10) to allow the film web to feed out with less compressive force (film tension).
3. Select a film of thinner gauge requiring less force to load to make it elastic.
4. Select a film of softer composition that will behave in a more gentle fashion.
5. Decrease the Turntable Run Speed setting. (Refer to Section 5:2:4:4:5)

7:3 Film Tearing & Puncturing

If the film is tearing or puncturing, determine whether the film is being damaged before leaving the ***Super Rapid Thread II***TM prestretch, or after leaving the prestretch and as it is applied to the load.

If the film is being damaged **before** leaving the prestretch try the following:

1. Check the roll of film for any signs of damage such a bad edge caused by the roll being dropped.
2. Check all the roller surfaces that the film web passes over for any signs of cutting, imperfections or a build-up of film.

• **WARNING!** ***PINCH POINTS*** *Be careful to keep hands, hair and loose clothing well clear of the polyurethane coated prestretch rollers and aluminum pinch rollers while power is applied!*

3. If the roll of film does not appear to have been damaged and there are no detectable imperfections on the prestretch rollers, nip rollers or dancer rollers, it may be necessary to change the ***Super Rapid Thread II™*** prestretch ratio to a lower prestretch percentage, or select a higher quality film.

If the film is being damaged **after** leaving the prestretch and as it is applied to the load try the following adjustments:

1. Decrease the Force to Load setting to allow the film web to feed out with less compressive force, (tension).
2. For loads inset far from the corners of the pallet, move the film-roping bar upward to raise the bottom edge of the film web above the offending pallet corner(s).
3. Raise the film roping bar, (if the machine is so equipped), and adjust the carriage lower limit striker to its lowest position in order to rope the bottom edge of the film. This should provide enough film mass to grip the pallet without breakage.

• **CAUTION!** *Ensure that **at all times** the lower limit switch striker is positioned **BELOW** the film carriage limit switches lever arm. Failing to ensure this may result in the film carriage overrunning its allowable range of travel causing damage to the film carriage drive mechanism!*

• **NOTICE!** *These techniques may also be used with slip-sheet or carton clamp material handling systems if the pallet is not to be held captive to the load!*

7:4 Film Roping Bar (Optional)

Some machines may be equipped with a film-roping bar that will cause the bottom few inches of the film to be gathered in a roped fashion.

Adjusting the roping bar height will provide a strengthening feature useful for holding difficult product and slip-sheets in place and for general reinforcement of the lower tiers of the load.

Increase the roping bar height and adjust the carriage lower limit switch striker to its lowest position in order to rope the bottom edge of the film.

Should film roping not be required, simply raise the film carriage and the carriage lower limit switch striker to the desired height and then lower the film-roping bar away from the bottom edge of the film.

- ***CAUTION!*** *Ensure that **at all times** the lower limit switch striker is positioned **BELOW** the film carriage bottom limit switch lever arm. Failing to ensure this may result in the film carriage overrunning its allowable range of travel causing damage to the film carriage elevator drive mechanism!*

7:5 Uneven Top Surfaces

Loads with an uneven number of cartons on the top may require the Auto Height Control Photo-eye to be over-ridden in order to make the top of the load secure.

Turn the Auto Load Height Photo-Eye parameter <**OFF**> (refer to Section 5:2:4:3:2.1). The wrapping of the top of the load will now be controlled by the carriage upper limit switch signal instead of the photo-eye signal. Lower the upper limit switch striker to a position will allow the film to ride up over the top corners of the load by three to four inches. (The use of a top sheet is recommended.)

The carriage upper limit switch striker will over-ride the Auto Load Height Photo-eye function. To return to the photo-eye operating mode, reposition the upper limit switch striker back to its highest position and turn the Auto Load Height Photo-Eye function <**ON**> (refer to Section 5:2:4:3:2.1).

- **CAUTION!** *Ensure that **at all times** the upper limit switch striker is positioned **ABOVE** the film carriage limit lever arm. Failing to ensure this may result in the film carriage overrunning its allowable range of travel causing damage to the film carriage drive mechanism!*

7:6 Auto Load Height Photo-Eye False Signals

The Auto Load Height Photo-eye uses an infrared beam reflected off the load surface to trigger its output. Some products being wrapped may cause a false “bounce-back” due to color or inherent shininess, which confuses the machine and leads to improper top wrap function.

False signals may be able to be “tuned-out” through an adjustment of the photo-eye distance, (or sensitivity), setting and / or the time-delay setting located within the photo-eye. (Refer to Section 9:7 for details.)

7:7 Top Sheet Application

In some cases it is desirable to cover the top of the load with a top sheet of polyethylene film, and then wrap the edges of the top sheet into the load for security.

If it is necessary to install a top sheet, this can be easily accomplished by pressing the WRAP CYCLE START / PAUSE push-button during the wrap cycle, when the film carriage has reached the top of the load. This causes the wrap cycle to “pause” and all machine motion to come to a halt. The Cycle Pause condition is indicated by a message on the Operator Interface Panel (HMI) and flashing of the red Machine Busy Status Indicator beacon light, (if the machine is so equipped) and the blue POWER ON light.

Once the machine has come to a stop, place the top sheet over the top of the load and adjust it as necessary so that the sides of the top sheet drape down the sides of the load evenly.

Pressing the green CYCLE START button again will allow the wrap cycle to resume. As the wrap cycle continues, the top sheet will be wrapped into the load by the layers of film that are applied over the draped edges of the top sheet.

7:8 Reinforcing Band Application

In some cases it is desirable to add reinforcing bands of film between the top and bottom of the load as the film carriage is ascending or descending in order to further stabilize the load.

This is easily accomplished by pressing the <ENT> keypad button when the film carriage is at the desired height while the film carriage is ascending or descending during the wrap cycle, as indicated on the Operator Interface (HMI) screens.

WRAP CYCLE
IN PROGRESS

FILM CARRIAGE IS
DESCENDING TO WRAP
BASE OF LOAD
PRESS <ENT> TO
REINFORCE WRAP.

WRAP CYCLE
IN PROGRESS

FILM CARRIAGE IS
ASCENDING TO WRAP
TOP OF LOAD
PRESS <ENT> TO
REINFORCE WRAP.

Film Carriage Descending & Ascending Screens

This causes the film carriage elevator to “pause”, while the turntable continues to rotate, resulting in the application of reinforcing bands of film between the top and bottom of the load.

The Carriage Pause condition is indicated by a message on the Operator Interface Panel (HMI).

WRAP CYCLE
IN PROGRESS

FILM CARRIAGE PAUSED
PRESS <ENT> TO
RESUME OR WAIT
10 SECONDS.

Film Carriage Paused Screen

Pressing the <ENT> keypad button while the film carriage is paused will disable the pause condition and the film carriage elevator will resume traveling. Alternately, after ten seconds the Carriage Pause function will self-cancel and the film carriage elevator will resume traveling without further input from the operator.

8:0 MAINTENANCE REQUIREMENTS

8:1 Lubrication

When operating in normal environments the machine will require periodic lubrication and maintenance as described in the following section. Use standard industrial lubricants on a regular basis in proportion to the usage of the machine and the cleanliness of the surroundings.

Unless otherwise specified, lubricating oils and greases should be regular machine grade.

- **Caution!** *Refer to the individual gear-reducer maintenance instructions for correct lubricant specifications.*

8:2 Maintenance Frequency Recommendations

8:2:1 LP-SRT Low Profile

Item	Operation	Frequency
Turntable Support Rollers	Inspect	Quarterly
Turntable Drive Gear-Reducer	Change Oil	Refer to Component Mfr.'s Specifications
Turntable Drive Chain	Lubricate & Adjust Tension	Quarterly
Turntable Gear-Reducer Sprocket	Inspect & Tighten Set-screws	Quarterly
1PX Turntable Pulse Proximity Sensor	Inspect, Check / Adjust Sensing Distance, Tighten Locking Nuts If Required.	Quarterly
Film Carriage Elevator Drive Gear-Reducer	Change Oil	Refer to Component Mfr.'s Specifications
5PX Carriage Pulse Proximity Sensor	Inspect, Check / Adjust Sensing Distance, Tighten Locking Nuts If Required.	Quarterly
Carriage Safety Switch	Test Operation & Adjust As Required	Monthly
Carriage Lift Chain	Lubricate & Adjust Tension	Quarterly
Carriage Lift Sprockets	Inspect & Tighten Mounting / Set-screws	Quarterly

Item	Operation	Frequency
Carriage Limit Switch Arms	Inspect	Quarterly
Prestretch Roller Bearings	Inspect & Tighten Set-screws	Monthly
Prestretch Chains	Lubricate & Adjust Tension	Monthly
Prestretch Sprockets	Inspect & Tighten Set-screws	Monthly

8:2:2 HP-SRT High Profile

Item	Operation	Frequency
Turntable Support Wheels	Inspect & Grease	Quarterly
Turntable Drive Gear-Reducer	Change Oil	Refer to Component Mfr.'s Specifications
Turntable Drive Chain	Lubricate & Adjust Tension	Quarterly
Turntable Gear-Reducer Sprocket	Inspect & Tighten Set-screws	Quarterly
1PX Turntable Pulse Proximity Sensor	Inspect, Check / Adjust Sensing Distance, Tighten Locking Nuts If Required.	Quarterly
Film Carriage Elevator Drive Gear-Reducer	Change Oil	Refer to Component Mfr.'s Specifications
5PX Carriage Pulse Proximity Sensor	Inspect, Check / Adjust Sensing Distance, Tighten Locking Nuts If Required.	Quarterly
Carriage Safety Switch	Test Operation & Adjust As Required	Monthly
Carriage Lift Chain	Lubricate & Adjust Tension	Quarterly
Carriage Lift Sprockets	Inspect & Tighten Mounting / Set-screws	Quarterly
Carriage Limit Switch Arms	Inspect	Quarterly
Prestretch Roller Bearings	Inspect & Tighten Set-screws	Monthly
Prestretch Chains	Lubricate & Adjust Tension	Monthly
Prestretch Sprockets	Inspect & Tighten Set-screws	Monthly

• **CAUTION!** *Inspect and tighten the turntable drive chain after the first 100 operating hours. Follow the above-recommended schedule thereafter.*

• **CAUTION!** *Recommended lubrication and inspection frequency is based upon single shift operation. Adjust lubrication and preventative maintenance accordingly for increased usage or operation in a harsh environment.*

• **NOTICE!** *Some bearings are sealed-for-life rather than regreasable. No maintenance is required or anticipated for the life of the equipment.*

9:0 MAINTENANCE AND ADJUSTMENTS

9:1 Film Carriage Lift Chain Adjustment

To adjust the carriage lift chain, first lower the film carriage to its halfway position and remove the tower chain guard.

Visually inspect the carriage lift chain and shock-dampening spring. The chain should be taut on the bottom side where it attaches to the carriage, (about 3/4" side to side movement possible), with the spring slightly compressed.

If the chain is too loose the carriage movement will become somewhat jerky as the carriage raises or lowers.

To adjust the lift chain, adjust the two-clevis nuts above the spring until the desired tension is achieved. Then, securely tighten the two-clevis nuts against each other to prevent against loosening.

• **CAUTION!** *Do not over-tighten the chain! Excessive chain tension will overload the carriage lift gear-reducer and the upper support axle.*

Ensure that the sprockets are aligned parallel and centered with the chain at the pick up points. Run the carriage manually while holding the carriage cable away from the tower guard mounting posts and verify that the lift motion is free of binding and vibration.

• **WARNING!** *Never remove the carriage lift chain without first blocking the carriage for support!*

9:2 Turntable Removal & Installation

9:2:1 LP-SRT Low Profile

The Low Profile turntable is fitted to the center sprocket assembly using four 1/2"UNC flat-head bolts.

To remove the turntable, first remove the four flat head bolts securing the turntable to the center sprocket assembly. Install two 1/2"-13 UNC eye-bolts into the tapped holes in the top of the turntable, hook up a two-way chain or cross bar, and then raise the turntable with a fork-lift truck or chain fall.

To replace the turntable reverse the procedure, ensuring that the edge of the turntable is aligned to the surrounding deck, and then slowly rotate the turntable by hand, (holding the eye-bolts), until the holes in the turntable are aligned with the tapped holes in the turntable center sprocket assembly. Reinstall the four flat-head bolts and tighten securely.

9:2:2 HP-SRT High Profile

The High Profile turntable fits over a compound axle and is driven through the engagement of the center shaft pin with the slotted turntable socket hub. The turntable is held in place by gravity.

The turntable can be lifted off directly by hooking up a two-way or four-way chain with the hooks under the turntable skirt and then raising the turntable with a forklift truck or chain fall. Alternately, the turntable can be removed by placing one person at each corner and gently lifting the table off.

To replace the turntable reverse the procedure, centering the turntable and then lowering it onto the center shaft, then slowly rotate the turntable by hand until the pin on the center shaft aligns with the slot in the turntable socket. The turntable will then drop into position.

9:3 Turntable Drive Chain Adjustment

9:3:1 LP-SRT Low Profile

A direct chain drive system is used to rotate the Low Profile turntable. To adjust the chain, first remove the tower cover and turntable chain guard deck plate, then loosen the four nuts and bolts holding the drive motor and gear-reducer assembly in to the slotted holes of the support weldment. Loosen the adjusting bolt locknut and turn the adjusting bolt, (located on the front of the motor mount), clockwise until the desired chain tension is achieved. The chain should be taut, but not over-tight. Tighten the motor mount hardware and adjusting bolt locknut securely and replace the chain guard deck plate and tower cover.

• **CAUTION!** *Do not over-tighten the chain! Excessive chain tension will overload the turntable gear-reducer.*

• **CAUTION!** *Operate the turntable. It should be relatively quiet and should rotate without excessive chain noise or slapping. Readjust the chain tension as necessary.*

9:3:2 HP-SRT High Profile

A direct chain drive system is used to rotate the turntable. To adjust the chain, first remove the turntable and locate the drive motor and gear-reducer assembly. Loosen the drive motor and gear-reducer assembly mounting bolts and pull the assembly back until the desired chain tension is achieved. Retighten the bolts securely.

• **CAUTION!** *Do not over-tighten the chain! Excessive chain tension will overload the turntable gear-reducer.*

• **CAUTION!** *Operate the turntable. It should be relatively quiet and should rotate without excessive chain noise or slapping. Readjust the chain tension as necessary.*

9:4 Turntable Support Rollers (LP-SRT Low Profile)

The Low Profile support rollers consist of a precision ball bearing inserted into a plastic wheel cover. The rollers are installed in sets of three, on a common axle, in multiple cradles on the machine base plate beneath the turntable. These rollers will require no maintenance unless damaged by excessive impact loads or over-loading of the machine.

To access the turntable support rollers, remove the turntable as previously described. The support rollers can be removed in sets of three, by lifting the roller and axle assembly upwards and out the cradle. Spacers are installed between the rollers and the cradle to prevent the rollers from binding. To remove the rollers and spacers, remove the anti-rotation spring pin and then slide them off of the end of the support axle.

Replacement support rollers should be reinstalled by reversing the procedure. Ensure that the proper quantity of spacers are installed between the rollers and are properly oriented into the cradle and that all of the rollers within the cradle are able to turn freely.

9:5 Turntable Support Wheels (HP-SRT High Profile)

The High Profile support wheels are rigid casters with roller bearings and require periodic lubrication.

Remove the turntable as previously described. Each caster is equipped with a grease fitting on the end of the wheel axle. Use a grease gun to apply grease to the wheel bearings as required.

To replace a wheel, undo the wheel axle bolt and remove the wheel. In many cases only the wheel bearing will need replacing and not the entire wheel assembly.

Install the replacement wheel or bearing, and retighten the axle bolt securely.

Apply grease to the wheel bearing before running the machine.

9:6 Film Carriage Limit Switch Lever Arm Adjustment

The Top and Bottom Film Carriage Limit Switches are mechanical limit switches of standard design and may require some attention from time to time. Position the arm so that it will travel through the appropriate angle when struck, and not suffer from rebound or over-traveling.

Replace bent or broken lever arms. Check that all hardware securing the switch components together and to the machine are intact, and tightly secured. Test the switch for crisp action, and replace it if required.

9:7 Auto Load Height Sensing Photo-Eye Adjustments

The Auto Load Height Sensing Photo-eye uses an infrared beam reflected off the load surface to trigger its output. Some products being wrapped may cause a false “bounce-back” due to color or inherent shininess, which confuses the machine and leads to improper top wrap function.

False signals may be able to be “tuned-out” through an adjustment of the photo-eye distance (or sensitivity) setting located on the photo-eye.

The distance setting controls the intensity of the photo-eye beam and how far out it can detect an object. If it is set too high, objects beyond the load being wrapped on the turntable may be detected, preventing the carriage from stopping at the top of the load. If it is set too low, the load being wrapped on the turntable may not be detected, preventing the carriage from ascending or causing it to only ascend part way before stopping. Adjust the distance setting lower or higher accordingly to tune-out these problems. (Refer to Section 12:0 for specific details provided in the photo-eye manufacturer’s component literature.)

9:8 Variable Frequency Drives

The Turntable, Film Carriage Elevator, Prestretch and Film Hook are all driven by variable speed AC motors. Each of these motors is controlled by its own Variable Frequency Drive, (commonly known as a VFD), located inside the control panel.

All VFD parameters have been pre-calibrated at the factory and should not require adjustment.

Should adjustment be required, reference Section 15:0 for the recommended VFD parameters and Section 12:0 for specific details provided in the VFD manufacturer's component literature.

• **WARNING!** *Adjustments to VFD parameters should only be performed by a qualified technician!*

• **WARNING!** *All VFD parameters have been pre-calibrated at the factory and should not require adjustment.*

• **WARNING!** *The interior of the control panel remains powered even when the Power Off–On–Reset switch is turned to the **OFF** position. **ALWAYS disconnect power before opening the control panel!***

9:9 Turntable Positive Alignment Set-Up and Adjustment

If the turntable is not aligning correctly to its home position at the end of the automatic wrap cycle, it may be necessary to adjust the Turntable Positive Alignment settings.

The components related to the Turntable Positive Alignment feature include:

- The Turntable Run Speed and Turntable Realign Speed Control Parameters (Refer to Sections 5:2:4:4:5 & 5:2:4:4:6)
- The Realign Delay Timer (Refer to Section 5:2:4:4:7)
- The Turntable Accu-Count™ Proximity Sensor (1PX) located beneath the turntable. (Refer to Section 9:10)

Set-up or adjust the Turntable Positive Alignment as follows:

- **WARNING!** *The interior of the control panel remains powered even when the power switch is turned **OFF**. **ALWAYS unplug the machine before opening the control panel!***

1. Place a load on the turntable that is representative of the heaviest load typically to be wrapped.
2. Set the Realign Delay parameter to a value of 0.0 second.
3. Set the Turntable Realign Speed parameter to a value of 5.
4. If necessary, adjust the Turntable Run Speed parameter to set the desired running speed of the turntable. This is typically factory-set to approximately 12 RPM, (1 revolution every 5 seconds). Changing the Turntable Run Speed setting affects the positive alignment.
5. Cycle the machine. When the machine begins its final revolution, the Realign Delay Timer will time-out and the turntable will decelerate to a stop. Once the turntable has come to a stop, adjust the Turntable Realign Speed Control parameter, (in small increments), until the turntable starts to move slowly. The final setting of this will typically be a value of 10.

- **NOTICE!** *The ideal setting for the Turntable Realign Speed is a slow creep speed. This speed should be sufficient to move the turntable with a heavy load placed on it, but slow enough that there is no inertia that will cause the turntable to coast past the home position when the wrap cycle is complete!*

6. The turntable will continue to rotate at this realign speed until it reaches the home position, at which time the wrap cycle is complete and the turntable will stop.
7. If it is taking too long for the turntable to reach home position, increase the Realign Delay Timer setting, (parameter), over the course of the next few cycles until a setting is achieved that allows the least amount of time necessary for the turntable to reach the home position, but without coasting past. Keep in mind that the turntable **must** operate at the Realign Speed setting for long enough to lose all the inertia from the turntable **before** it reaches the Turntable Home Position.

9:10 Turntable Accu-Count™ Proximity Sensor Adjustment

HP-SRT High Profile and LP-SRT Low Profile machines are equipped with a Turntable Accu-Count™ Proximity Sensor located on the base of the machine, beneath the turntable.

The inductive proximity sensor used is a non-contact type switch that senses the teeth on the Turntable Center Sprocket.

The sensor used on the LP-SRT and HP-SRT has a nominal sensing distance of 5 mm (3/16"). The sensor must be mounted close enough to the sprocket teeth so that it will energize when it detects a tooth and de-energize as the space between the sprocket teeth is presented to the sensor. The pulses produced by the rotation of the sprocket are counted in the PLC logic program. The standard machine version is equipped with a seventy (70) tooth sprocket, so 70 pulses represents one rotation of the turntable.

Adjust the position of the Turntable Position Pulse Sensor by loosening the two jam nuts securing the proximity sensor to its mounting bracket. Move the proximity sensor in or out as required and re-tighten the jam nuts.

- ***WARNING!*** *When re-tightening the proximity sensor jam nuts, ensure that there is some clearance space between the face of the proximity sensor and the sprocket teeth!*

9:11 Dancer Proximity Sensor Installation & Adjustment

The Dancer Proximity Sensor controls the prestretch film delivery system speed and the starting & stopping of the prestretch motor.

The Dancer Proximity Sensor detects a steel cam that is mounted to the dancer bar pivot shaft. As the dancer bar pivots and the distance between the cam and the Dancer Proximity Sensor increases, the prestretch motor will turn on and gradually increase in speed. With the dancer bar in its fully retracted position, the prestretch motor should come to a complete stop.

If it should become necessary to replace or adjust the Dancer Proximity Sensor, proceed as follows:

1. Raise the film carriage to a good working height and then remove power from the machine.
2. Remove the prestretch carriage cover.

3. If the prestretch motor is not shutting off completely when the dancer bar is in the retracted position, adjust the position of the Dancer Proximity Sensor closer to the cam by loosening the two jam nuts securing the proximity sensor to its mounting bracket. Move the proximity sensor closer to the cam and re-tighten the jam nuts.

• **WARNING!** *When re-tightening the proximity sensor jam nuts, ensure that there is some clearance space between the face of the proximity sensor and the cam!*

4. If the prestretch motor is not starting the motor soon enough when the dancer bar is pulled away from its retracted position, adjust the position of the Dancer Proximity Sensor further from the cam by loosening the two jam nuts securing the proximity sensor its mounting bracket. Move the proximity sensor further from the target and re-tighten the jam nuts.

• **WARNING!** *When re-tightening the proximity sensor jam nuts, ensure that there is some clearance space between the face of the proximity sensor and the cam!*

5. Alternately, rotating the cam slightly on the dancer bar pivot shaft may improve the start-up point of the prestretch motor. Loosen the set-screw securing the cam to the dancer bar pivot shaft and rotate the cam slightly clockwise. It may be necessary also to re-adjust the distance between the Dancer Proximity Sensor and the cam after doing this.

• **WARNING!** *When re-tightening the proximity sensor jam nuts, ensure that there is some clearance space between the face of the proximity sensor and the cam!*

6. Re-connect power to the machine and test the operation. Re-adjust as necessary, and when everything is satisfactory replace the prestretch carriage cover.

• **WARNING!** ***PINCH POINTS*** *Be careful to keep hands, hair and loose clothing well clear of the polyurethane coated prestretch rollers and aluminum pinch rollers while power is applied!*

9:12 Carriage Height Pulse Proximity Sensor Adjustment

The Carriage Height Pulse Sensor (5PX) generates a pulse for approximately every 3/8" of film carriage travel. This pulse is used to determine the precise position of the film carriage at any point during the wrap cycle and will determine when various other functions of the cycle commence or finish.

The sensor used on the LP-SRT and HP-SRT has a nominal sensing distance of 1.5 mm, (approximately the thickness of a business card). The sensor must be mounted close enough to the sprocket teeth so that it will energize when it detects a tooth and de-energize as the space between the sprocket teeth is presented to the sensor. The pulses produced by the rotation of the sprocket are counted in the PLC logic program.

Adjust the position of the Turntable Position Pulse Sensor by loosening the two jam nuts securing the proximity sensor to its mounting bracket. Move the proximity sensor in or out as required and re-tighten the jam nuts.

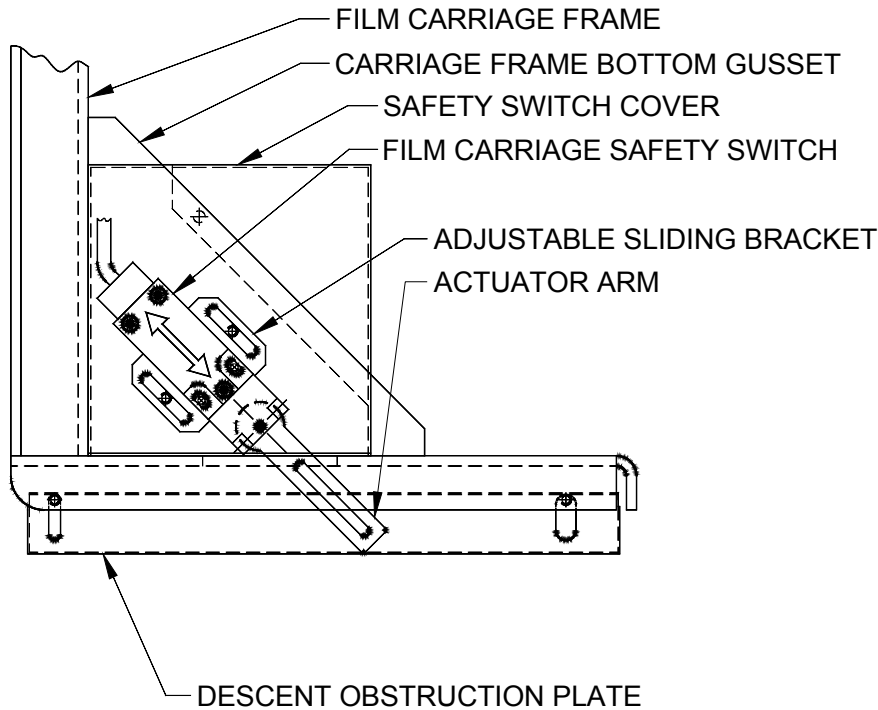
- ***WARNING!*** *When re-tightening the proximity sensor jam nuts, ensure that there is some clearance space between the face of the proximity sensor and the sprocket teeth!*

9:13 Film Carriage Safety Switch Adjustment

LP-SRT and HP-SRT Platform Automatic stretch wrap machines are equipped with a Descent Obstruction Plate. The Descent Obstruction plate is designed to "trip" the Film Carriage Safety Switch in the event that it becomes obstructed. The Film Carriage Safety Switch is a rotary lever safety limit switch with positive-break contacts, and may require some attention from time to time.

To access the Film Carriage Safety Switch, first remove the screws securing the safety switch cover to the film carriage frame and remove the cover by lifting it up and off the film carriage.

The Film Carriage Safety Switch is mounted onto an adjustable sliding bracket, which is slotted to allow diagonal adjustment. This sliding bracket is mounted to the film carriage frame bottom gusset. The actuation / de-actuation point of the Film Carriage Safety Switch is adjusted by loosening the adjustable sliding bracket and moving the Film Carriage Safety Switch diagonally to increase or decrease the pre-load on the actuator arm. The following illustration depicts the nominal limit switch mounting location and actuator arm angle. The Film Carriage Safety Switch should be adjusted so that the switch actuates with minimal upward motion at each corner of the Descent Obstruction Plate.



It is **extremely important** that the Descent Obstruction Plate **must** actuate the Film Carriage Safety Switch if struck at any point on its surface area.

After any adjustment is made to the Film Carriage Safety Switch, it is imperative that the Descent Obstruction Plate be tested by actuating it on all four corners, sides and quadrants to confirm that the Film Carriage Safety Switch will “trip”, irrespective of where the Descent Obstruction Plate is actuated.

Failure to thoroughly test the operation of the Film Carriage Safety Switch after performing any adjustment may render this safety feature inoperable!

- **WARNING!** *Adjustments to the Film Carriage Safety Switch should only be performed by a qualified technician!*

- **WARNING!** *Thoroughly test the operation of the Descent Obstruction Plate and Film Carriage Safety Switch after performing any adjustments!*

9:14 Prestretch Roller Cleaning Procedure

Most cleaning agents **will** permanently damage the polyurethane coating. Should the cleaning of polyurethane coated prestretch rollers become necessary the recommended procedure is as follows. Into a bucket of warm water, add a few drops common dish detergent and mix thoroughly. Then with the aid of a common "fingernail" cleaning brush, scrub the prestretch rollers thoroughly. Rinse the prestretch rollers thoroughly with plain water and dry completely.

- **WARNING!** *No form of Solvent or Naphtha based products can be used to clean the polyurethane coated prestretch rollers!*

10:0 TROUBLE-SHOOTING

10:1 Trouble-shooting Operator Interface Fault Messages

The 2100-SRT Platform Automatic stretch wrap machine is programmed to be able to detect a number of different fault conditions and display corresponding fault messages and diagnostic information on the Operator Interface Panel (a.k.a. HMI – Human/Machine Interface).

These messages are displayed with a red background to draw attention to the fault condition. In addition, the red Machine Busy/Fault beacon light and the Power On indicator light on the control panel will flash when a fault has been detected.

Fault screens use a standardized format that, in addition to the message display area, typically includes three buttons, which function as follows:

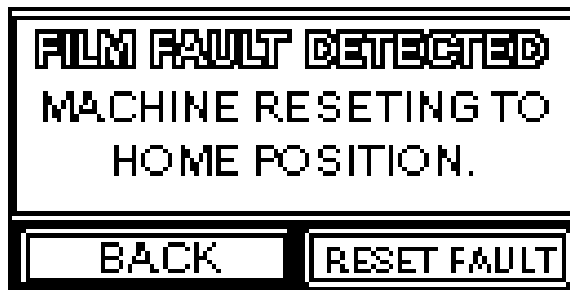
BACK – pressing this button causes the display to return to the Manual Operation Screen

RESET FAULT – pressing this button will reset the fault condition, if the fault is of a type that does not need to be retained in memory until alternate action is taken by the operator.

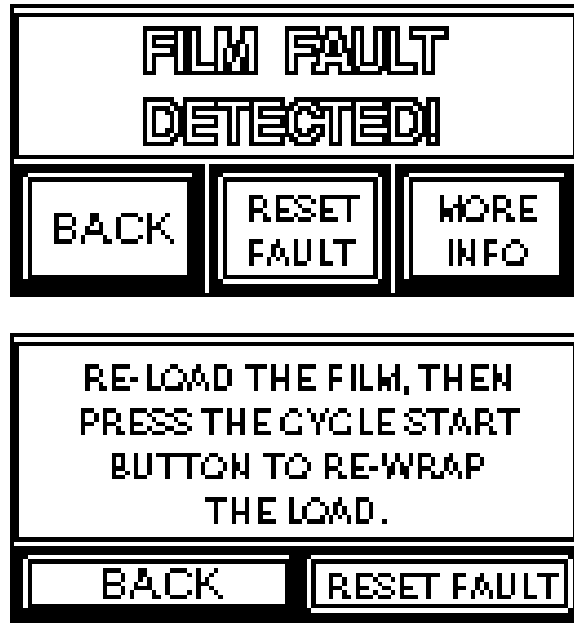
MORE INFO – pressing this button will cause a second screen to be displayed that provides detailed diagnostic and corrective information about the fault condition.

10:1:1 Film Fault (Optional)

A film fault is caused by a loss of film tension during the wrap cycle. A film fault will not be registered until the second turntable revolution has been completed, and cannot be detected after the machines goes into deceleration mode in the final revolution of the wrap cycle.



The screen above is displayed when a Film Fault has been detected and the machine is in the process of resetting to home position.

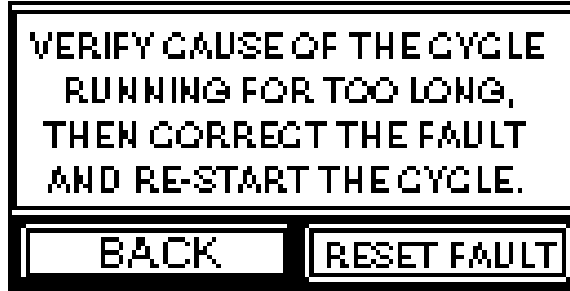


The screens above are displayed when a Film Fault has been detected and the machine has completed resetting to home position.

In the event that the film breaks or runs out during the wrap cycle, the dancer bar on the prestretch film carriage springs back to the retracted position, activating the Broken Film Sensor (6PX). After a time-delay to verify the absence of film tension, the machine initiates a Film Fault Reset Cycle and signals the fault condition by flashing the optional red Machine Busy / Fault beacon light (1BL) and displaying a diagnostic message on the Operator Interface Panel (HMI) display.

10:1:2 Wrap Cycle Watchdog Timer Fault

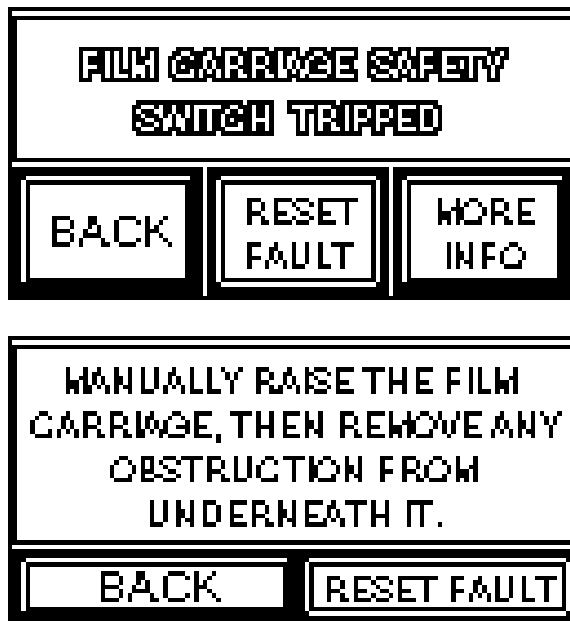




All the while the wrap cycle is in progress (except during a Cycle Pause request or a Film Carriage Pause request), the Wrap Cycle Watchdog timer in the PLC records the elapsed cycle time. If the elapsed cycle time reaches the preset value in the timer, the wrap cycle will immediately be aborted and the message screens above will be displayed. The timer's preset value is nominally set to 300 seconds (5 minutes).

Possible causes of this fault condition could be a blown Turntable or Film Carriage motor fuse or SCR card, or a sensor failure that prevents the wrap cycle from stepping through its sequence in the proper fashion. It is also conceivable that the Wrap Cycle Watchdog Timer could time-out before the cycle is completed if the end-user programs the machine to put on a high number of wrap revolutions with the turntable and film carriage speeds set very low.

10:1:3 Film Carriage Safety Switch Tripped Fault



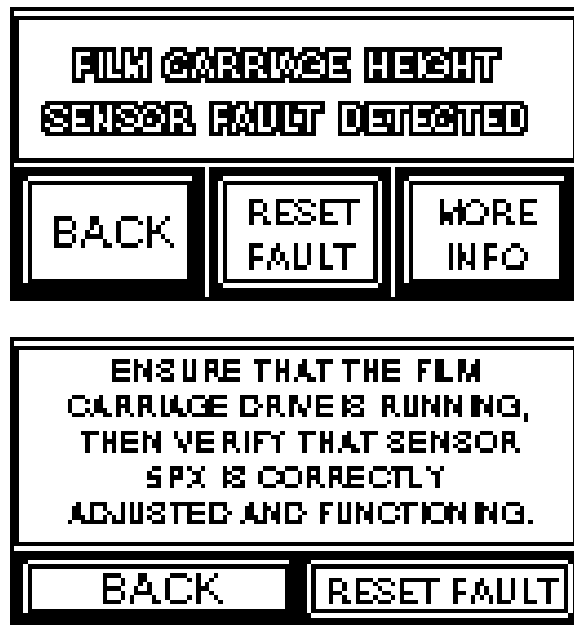
SW-A Platform Automatic stretch wrap machines are equipped with a Descent Obstruction Plate and Film Carriage Safety Switch, located beneath the Film Carriage.

The purpose of the Film Carriage Safety Switch is to disable the wrap cycle and carriage lower function in the event that the Descent Obstruction Plate is obstructed, (i.e. by some foreign object located between the bottom of the film carriage and the base of the machine), during the wrap cycle or when the film carriage is being manually lowered using the Film Carriage Lower button.

When the Film Carriage Descent Obstruction Plate is actuated, the Carriage Safety Switch contacts “open”, disabling the Auto Wrap Cycle and Film Carriage Lower functions of the machine. In the event that the film carriage safety switch is tripped, this condition will be indicated by the red flashing beacon light and by the error messages shown above.

To reset the machine after the film carriage safety switch has been tripped, manually raise the film carriage using the Film Carriage Raise button, or cycle the power by turning the Power Off–On–Reset Switch to the **OFF** position and then back to the **RESET** position.

10:1:4 Film Carriage Height Sensor Fault



If the Carriage Height Pulses sensor (5PX) remains either on or off for longer than preset watchdog times during film carriage elevator operation, the sensor is presumed to be out of adjustment or defective, or the Film Carriage lift is not functioning.

Possible causes are a defective or misadjusted Carriage Height Pulses sensor (5PX), or a blown Film Carriage motor fuse (2AFU or 2BFU), or a defective film Carriage drive card (2SCR), or a broken Film Carriage lift belt.

10:2 Trouble-Shooting Guide

In the event of a machine malfunction, the suggestions listed in this section will assist in determining the cause of a failure and possible remedies.

Many of the corrective actions recommended here require technical ability. **Only qualified and fully trained personnel should perform the corrective actions listed in this trouble-shooting guide!**

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Power light is not illuminated. HMI (Operator Interface Panel) screen is not illuminated.	Optional Main Disconnect Switch is turned to the O (Off) position	Turn the Optional Main Disconnect Switch to the I (On) position.
	Electrical power supply is disconnected	Re-connect electrical power supply to the machine.
	Electrical power source supplying the machine is dead	Turn on electrical supply source or reset electrical supply circuit breaker or fuses.
	Power failure occurred	Turn the Power Off–On–Reset Switch to the RESET position momentarily to restart the control power.
	Emergency Stop Push-Button is pushed in	Pull out the E-Stop button, then Turn the Power Off–On–Reset Switch to the RESET position momentarily to restart the control power.
	<i>Super Rapid Thread II™</i> Prestretch Safety Door is open	Close <i>Super Rapid Thread II™</i> Prestretch Safety Door.
	<i>Super Rapid Thread II™</i> Prestretch Door Safety Switch is defective	Replace defective <i>Super Rapid Thread II™</i> Prestretch Door Safety Switch.
	Blown 120VAC control fuse #1FU	Replace fuse #1FU with one of same type and rating. (Fast-blow)
2. Power On light is not illuminated.	Blown Power Supply Input fuse #5FU	Replace fuse #5FU with one of same type and rating. (Fast-blow)
	Power Off–On–Reset Switch is turned to the OFF position	Turn the Power Off–On–Reset Switch to the RESET position momentarily to restart the control power.
	Emergency Stop Push-Button is pushed in	Pull out the E-Stop button, then Turn the Power Off–On–Reset Switch to the RESET position momentarily to restart the control power.

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
3. Power Indicator Light or Machine Busy (red) status indicator beacon light, (optional), is flashing	Wrap Cycle Pause function was selected by the operator during the wrap cycle	De-select the Wrap Cycle Pause feature. (Refer to section 5:1:4 item #2)
	Carriage Pause function was selected by the operator during the wrap cycle	De-select the Carriage Pause feature, (Refer to section 7:8), or wait 10 seconds for pause to time-out.
	Film Fault detected (optional)	Correct film fault condition, reload the film and rewrap the load. (Refer to Section 6:6)
	The Wrap Cycle Watchdog Timer timed-out during a wrap cycle	Repeat cycle to verify cause of machine cycle time over-run.
4. Turntable does not run in wrap cycle or with Turntable Jog button	Turntable jamming	Try rotating turntable by hand. If it will not move, check for signs of mechanical binding or jamming.
	Turntable Speed setting is too low	Increase the Turntable Speed setting. (Refer to section 5:2:4:4:4 & 5:2:4:4:5)
	Blown Power Supply Input fuse #5FU	Replace fuse #5FU with one of same type and rating. (Fast-blow)
	Turntable drive sprocket or motor key missing, or chain has fallen off	If motor appears to be running, but turntable does not rotate check that turntable sprocket key and key between the motor shaft and the gear-reducer input shaft are intact. Replace keys if missing. Ensure that turntable chain is on.
	Defective Turntable Gear-Reducer	If motor is running, but turntable does not rotate and all keys and drive chain are intact, replace gear-reducer.
	Defective Turntable Motor	Check for AC voltage at the motor terminals. If voltage is present but motor will not run, replace motor).
5. Turntable is noisy	Turntable jamming	Try rotating turntable by hand. If it will not move, check for signs of mechanical binding or jamming.
	Machine is installed on an uneven surface	Relocate machine to a flat, clean, level surface.
	Turntable drive chain too slack	Adjust turntable drive chain tension. (Refer to Section 9:3)

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
Turntable is noisy ...continued...	LP Turntable support rollers worn out	Replace LP turntable support rollers. (Refer to Section 9:4)
	Incorrect orientation of LP turntable support roller spacers and / or retaining rings.	Verify and correct LP support roller spacer & retaining ring orientation. (Refer to Section 9:4)
	HP Turntable support wheels require lubrication	Lubricate wheels. (Refer to Section 9:5)
	Turntable support wheels or wheel bearings worn out	Replace wheels or wheel bearings. (Refer to Section 9:5)
6. Turntable runs too slowly or Turntable stalls when wrapping a heavy load	Turntable Speed setting is too low	Increase the Turntable Speed setting. (Refer to section 5:2:4:4:5)
	Load weight exceeds capacity of the machine	Do not wrap loads that exceed the rated weight capacity of the machine!
	Machine is installed on an uneven surface	Relocate machine to a flat, clean, level surface.
	Turntable support rollers worn out	Replace turntable support rollers. (Refer to Section 9:4)
7. Turntable runs too fast and / or speed cannot be varied	Turntable Speed setting is too fast	Decrease the Turntable Speed setting. (Refer to section 5:2:4:4:5)
8. Turntable will not shut off	Wrap cycle not sequencing properly	Press in the E-Stop button. If the turntable stops, see "Wrap Cycle not Sequencing Properly" trouble-shooting later in this section.
9. Film Carriage will not raise or lower	Carriage Speed setting(s) too low	Increase the Carriage Speed setting. (Refer to sections 5:1:8 & 5:1:9)
	Carriage jammed	Move carriage from side to side and back and forth by hand. There should be some play between the carriage guide wheels and the bars on which they run. If the carriage cannot be moved at all, check for mechanical binding or jamming.
	Blown Power Supply Input fuse #5FU	Replace fuse #5FU with one of same type and rating. (Fast-blow)
	Defective Carriage Motor	Check for DC voltage at the motor terminals. If voltage is present but motor will not run, repair or replace motor. (Refer to Section 9:14)

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
Film Carriage will not raise or lower ...continued...	Some foreign object is lodged between the bottom of the film carriage and machine base	The film carriage Descent Obstruction Plate has been actuated. Manually raise the film carriage and remove the obstruction.
	The film carriage Descent Obstruction Plate is jammed in the up position	Raise film carriage to working height and move film carriage Descent Obstruction Plate from side to side & back and forth by hand to allow the plate to drop into the down position. There should be some play between the carriage frame and the safety stop plate. If the film carriage Descent Obstruction Plate cannot be moved at all, check for signs of mechanical binding or jamming.
	Improperly adjusted Carriage Safety Switch	Adjust Carriage Safety Switch. (Refer to Section 9:17)
	Defective Carriage Safety Switch	Disconnect Carriage Safety Switch and check with an ohmmeter. Replace if defective.
10. Film Carriage will not raise during wrap cycle	Photo-eye is detecting voids in the load	Restack load or wrap with photo-eye over-ridden. (Refer to Section 7:6)
	Improperly set-up photo-eye	Check photo-eye settings. Standard photo-eye has "Light-On" operation and is set for "Off-Delay" timing. (Refer to Section 9:7)
	Defective photo-eye	Check photo-eye status indicators and operation during cycle. If photo-eye is not responding properly and settings are correct, replace photo-eye.
	Wrap cycle not sequencing properly	See "Wrap Cycle not Sequencing Properly" troubleshooting later in this section.
11. Film Carriage will not lower during wrap cycle	Wrap cycle not sequencing properly	See "Wrap Cycle not Sequencing Properly" troubleshooting later in this section.
12. Film Carriage raises and lowers too slowly	Carriage Speed setting(s) are too low	Increase the Carriage Speed setting(s). (Refer to sections 5:1:8 & 5:1:9)

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
13. Film Carriage raises and lowers too fast and / or speed cannot be varied	Carriage Speed setting(s) are too fast	Decrease the Carriage Speed setting(s). (Refer to sections 5:1:8 & 5:1:9)
14. Film Carriage Lift movement is jerky	Carriage Lift Chain has seized or requires lubrication	Lubricate or replace the chain. (Refer To Section 9:1)
15. Prestretch will not run	Film is incorrectly threaded	Thread film correctly. (Refer to section 6:2)
	Power Off / On / Reset switch is in to the Off position	Turn the Power Off / On / Reset switch to the Reset position and release to the On position.
	Film Force to Load setting is too high	Decrease the Film Force to Load setting. Refer to section (5:1:10)
	Blown Power Supply Input fuse #5FU	Replace fuse #5FU with one of same type and rating. (Fast-blow)
	Dancer Proximity Sensor and / or Target Cam incorrectly adjusted	Adjust distance between Dancer Proximity Sensor and cam. Adjust position of cam if necessary. (Refer to Section 9:11)
	Dancer Proximity Sensor Defective	Check for 24 Volts DC across terminals #16 & #18 on control panel terminal plug J9 with Dancer Bar retracted & Film Force to Load pot set at zero. Then, check for 0 Volts DC across terminals #17 & #18 on control panel terminal plug J9 with Dancer Bar retracted & Film Force to Load setting at zero, increasing to approximately 10 Volts DC as the Dancer Bar is pulled out to the fully extended position. If correct readings are not attainable, replace defective Dancer Proximity Sensor. (Refer to Section 9:13)
	Defective Prestretch Motor	Check for AC voltage at the motor terminals. If voltage is present but motor will not run, replace motor).
16. Prestretch runs too fast and / or speed cannot be varied	Force to Load setting is too low	Increase the Force to Load Pot setting. Refer to section (5:1:10)

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
Prestretch runs too fast and / or speed cannot be varied ...continued...	Dancer Proximity Sensor and / or Target Cam incorrectly adjusted	Adjust distance between Dancer Proximity Sensor and cam. Adjust position of cam if necessary. (Refer to Section 9:13)
	Dancer Proximity Sensor Defective	Check for 24 Volts DC across terminals #16 & #18 on control panel terminal plug J9 with Dancer Bar retracted & Film Force to Load pot set at zero. Then, check for 0 Volts DC across terminals #17 & #18 on control panel terminal plug J9 with Dancer Bar retracted & Film Force to Load setting at zero, increasing to approximately 10 Volts DC as the Dancer Bar is pulled out to the fully extended position. If correct readings are not attainable, replace defective Dancer Proximity Sensor. (Refer to Section 9:13)
	Defective Prestretch Motor	Check for AC voltage at the motor terminals. If voltage is present but motor will not run, replace motor).
17. Prestretch continues to run after the film has been cut	Dancer Bar not returning fully to home position due to broken, weak or missing spring(s)	Replace Dancer Bar spring(s).
	Dancer Bar not returning fully to home position due to Dancer Bar roller or film diverter roller not turning freely	Adjust Dancer Bar Assembly hardware to eliminate end clamping of dancer roller bearings, or replace roller(s).
	Dancer Bar not returning fully to home position due to binding or misalignment of Dancer Bar Assembly and pivot bushings	With dancer bar springs removed, the Dancer Bar Assembly should be able to swing freely. Adjust dancer bar hardware to eliminate end clamping of Dancer Bar Assembly. Ensure that pivot bushings are straight.
	Dancer Proximity Sensor and / or Target Cam incorrectly adjusted	Adjust distance between Dancer Proximity Sensor and cam. Adjust position of cam if necessary. (Refer to Section 9:13)

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
Prestretch continues to run after the film has been cut ...continued...	Dancer Proximity Sensor Defective	Replace defective Dancer Proximity Sensor. (Refer to Section 9:13)
18. Prestretch is noisy	Prestretch sprockets and / or chain(s) loose or misaligned	Check prestretch sprocket set-screws and tighten. Ensure sprockets are level. Adjust prestretch chains by loosening motor and / or prestretch chain idler sprocket and taking-up slack in chains(s).
19. Wrap Cycle not Sequencing Properly	Blown Fuse F2, F4, F6 or F9	Replace fuse F2, F4, F6 or F9 with one of same type and rating.
	SWCB Hardware Problem	Verify that all terminal plugs are securely installed on to the SWCB
19A. Wrap Cycle will not start	Blown Power Supply Input fuse #5FU	Replace fuse #5FU with one of same type and rating. (Fast-blow)
19B. Film Carriage does not raise during wrap cycle	Auto Load Height Sensing Photo-eye not "seeing" the load	Check Photo-eye for correct operation and set-up. (Refer to Section 9:7)
19C. Film Carriage overshoots the top of the load being wrapped	Auto Load Height Sensing Photo-eye turned OFF	Turn Auto Load Height Sensing Photo-eye ON . (Refer to section 5:2:4:3:2.1)
	Top Overlap Setting incorrect	Adjust Top Overlap Setting to provide the desired amount of film over top of the load. (Refer to section 5:2:4:3:2.2)
	Carriage Height Pulse Sensor #5PX out of adjustment	Adjust Carriage Height Pulse Sensor so that it detects teeth on the carriage lift chain top idler sprocket.
	Carriage Height Pulse Sensor #5PX is defective	Replace defective Carriage Height Pulse Sensor
19D. Film Carriage does not lower during wrap cycle	Turntable Accu-Count™ Proximity Sensor #1PX requires adjustment	Adjust the Turntable Accu-Count™ Proximity Sensor. (Refer to Section 9:10)
	Turntable Accu-Count™ Proximity Sensor #1PX is defective	Replace Turntable Accu-Count™ Proximity Sensor

PROBLEM DETECTED	POSSIBLE CAUSE	CORRECTIVE ACTION
Film Carriage does not lower during wrap cycle ...continued...	Some foreign object is lodged between the bottom of the film carriage and the base of the machine	The film carriage Descent Obstruction Plate has been actuated. Manually raise the film carriage and remove the obstruction.
	The film carriage Descent Obstruction Plate is jammed in the up position	Raise film carriage to working height and move film carriage Descent Obstruction Plate from side to side & back and forth by hand to allow the plate to drop into the down position. There should be some play between the carriage frame and the safety stop plate. If the film carriage Descent Obstruction Plate cannot be moved at all, check for signs of mechanical binding or jamming.
	Improperly adjusted Carriage Safety Switch	Adjust Carriage Safety Switch (Refer to Section 9:17)
	Defective Carriage Safety Switch	Disconnect Carriage Safety Switch and check with an ohmmeter. Replace if defective.
19E. Turntable does not re-align at Home Position properly	Turntable Realign Speed not set correctly	Perform Turntable Positive Alignment Set-up. (Refer to Section 9:9)
	Turntable Accu-Count™ Proximity Sensor #1PX requires adjustment	Adjust the Turntable Accu-Count™ Proximity Sensor. (Refer to Section 9:11)
	Turntable Accu-Count™ Proximity Sensor #1PX is defective	Replace Turntable Accu-Count™ Proximity Sensor

11:0 PARTS LISTS

The parts lists shown in this section are for the end-user's reference in identifying components of the machine. When a malfunction is traced to a failed component, the part number for that component will aid in the procurement of a replacement part.

The description of each component in the parts list is generic. In order to identify the item exactly, the manufacturer and manufacturer's part number (along with any other nameplate data) should be obtained from the item itself.

Those items that are marked "Y" in the **SP** (Spare Parts) column are recommended as spare parts to be stocked by the end-user.

MATERIAL LIST**2100-SRT SERIES LOW PROFILE SEMI-AUTOMATIC STRETCH WRAP MACHINE**

Machine Assembly Dwg: G2100-208-00 Rev. 13

Electrical Drawing: E2100-188 Rev. 0A

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
1	LP2100 SERIES MACHINE BASE & TURNTABLE DRIVE - MECHANICAL ASSEMBLY - G2300-093-00-R5					
1.1	Machine Base	1	ea.		G2300-093-01-00-R8	LP2100 Series Base Weldment for 57" Diameter Turntable
1.2	Turntable	1	ea.		C3314	Turntable - 57" Diameter x 1/4" Thick - Bolt On
1.2A	Turntable	0	ea.		C5287	Turntable - 57" Diameter x 1/4" Thick - Diamond Plate
1.3	Turntable Deck Plate	1	ea.		F3598	Turntable Deck (Filler) Plate
1.10	Turntable Support Wheel - Gang of 3 Assembly - each consisting of:	14	ea.	Y	S236-W	
1.10.1	Turntable Support Wheels	3	ea.		S153 (W167)	Molded Nylon Wheel c/w Ball Bearing 32mm OD x 12mm ID x 10mm Wide
1.10.2	Turntable Support Wheel Spacer	3	ea.		H1011	Turntable Support Wheel Nylon Spacer
1.10.3	Turntable Support Wheel Axle	1	ea.		M510	Turntable Support Wheel Shaft 12mm Dia.
1.10.4	Turntable Support Wheel Axle	1	ea.		H960	Spring Pin Slotted 1/8" Dia. x 0.875" Long
1.33	Support Wheel Cradel	14	ea.		H1094	Spring Pin Slotted 1/8" Dia. x 9/16" Long
1.4	Turntable Gear-Reducer (Standard)	1	ea.	Y	A506	Flexbloc Worm Speed Reducer With IEC Input Adapter, Ratio 20:1, 1" Dia. Output Shaft
1.5	Turntable Motor	1	ea.	Y	A461	Motor Type 71L/4 IEC C105, 0.37kW - 1/2 HP 230/460 Volt 3 Phase 60 Hz. 1750 RPM TEFC UL/cCSAus, IP55
1.5A	Turntable Motor (Optional)	0	ea.		A477	Motor Type 80S/4 IEC - 3/4 HP 230/460 Volt 3 Phase 60 Hz. 1750 RPM TEFC UL/cCSAus, IP55
1.6	Turntable Gear-Reducer Mounting Plate	1	ea.		F2230-R1	Right-Angle Reducer Mounting Plate for Nord Gear-Motor
1.7	Gear Reducer Sprocket	1	ea.		K180	Sprocket 50B12 x 1" Bore, K2SS
1.8	Turntable Center Sprocket	1	ea.		K510	Turntable Center Sprocket Weldment, 50A70 - Bolt On
1.9	Turntable Center Sprocket	1	ea.	Y	B126-2	Ball Bearing Double Row 30mm ID x 62mm OD
1.11	Turntable Drive Chain	1	ea.		K625	Roller Chain ANSI #50 Rivet Type - 207 Pitches Long + Connecting Link
1.12	Turntable Drive Chain	0	ea.	Y	K121	Connecting Link ANSI #50
1.14	Turntable Position Proximity Sensor	1	ea.			<i>Refer to Electrical portion of this Material List, under "Electrical Controls on Machine Base"</i>
1.15	Turntable Gear-Reducer Mounting Hardware	4	ea.		H1381	Hex Cap Screw M8 - 30 mm Long
1.16	Turntable Gear-Reducer Mounting Hardware	6	ea.		H1214	Hex Nut M8
1.28	Turntable Gear Reducer Mounting Nut Bar	1	ea.		F2290	Gear-Reducer Nut Bar
1.25	Turntable Gear-Reducer Mounting Hardware	4	ea.		H776	Lock Washer for Bolt Size M8
1.26	Turntable Gear-Reducer Mounting Hardware	8	ea.		H775	Flat Washer for Bolt Size M8
1.17	Turntable Mounting Bolts	4	ea.		H1387	Flat Head Socket Screw M12 - 25 mm Long
1.18	Chain Tensioning Hardware	2	ea.		H1468	Hex Cap Screw M8 - 50mm Long Fully Threaded
1.19	Chain Tensioning Hardware	2	ea.		H1469	Nylon Insert Lock Nut M8
1.20	Turntable Deck Plate Mounting Screws	6	ea.		H1388	Button Head Socket Screw M6 - 12 mm Long
1.21	Tower Mounting Hardware	4	ea.		H1379 (H753)	Hex Cap Screw M12x1.75 - 30 mm Long
1.22	Gear-Motor Mounting Plate Hardware	2	ea.		H1408	Hex Cap Screw M12x1.75 - 35 mm Long
1.23	Gear-Motor Mounting Plate Hardware	2	ea.		H765	Hex Nut M12x1.75 Plated

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
1.24	Tower Mounting Hardware / Gear-Motor Mounting Plate Hardware	6	ea.		H1402	Lock Washer Bolt Size M12 Plated
1.27	Turntable Drive Gear-Motor Cover / Guard	1	ea.		F2231	Gear-Motor Cover Guard for LP2100-SRT / LP1100-S Turntable Drive
1.30	Turntable Center Sprocket Shaft	1	ea.		H1540	Button Head Screw M10 x 16mm Long
1.31	Turntable Center Sprocket Shaft	1	ea.		H773	Flat Washer 1.75" OD x 0.688 ID x 0.13"
1.32	Turntable Center Sprocket Shaft	1	ea.		H771	Flat Washer 3/8" Dia. Nominal Plated

6	RAMP WELDMENT					
	Ramp Weldment	1	ea.		C3156	48" x 60" Ramp Weldment

7A	PORCH WELDMENT					
	Porch Weldment	1	ea.		C3279	48" x 24" Porch Weldment

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
3	2100 SERIES STD. TOWER & FILM CARRIAGE LIFT DRIVE - MECHANICAL ASSEMBLY - G2700-052-00 R4A					
3.1	Tower Structure	1	ea.		G2700-052-01-00	Tower Frame Weldment - Standard 80" Wrap Height
3.2A	Film Carriage Lift Gear-Reducer	1	ea.	Y	A606	FlexBloc Worm Speed Reducer with IEC Input Adapter, 60:1 Ratio, Mounting Position M3, 1" Dia. Output Shaft
3.3	Film Carriage Lift Motor	1	ea.	Y	A461	Motor Type 71L/4 IEC C105, 0.37kW - 1/2 HP 230/460 Volt 3 Phase 60 Hz. 1750 RPM TEFC UL/cCSAus, IP55
3.4	Gear-Motor Sprocket	1	ea.		K174	Sprocket 40B17 x 1" Bore c/w Keyway & Set-Screws
3.5	Bottom Idler Sprocket	1	ea.	Y	K571	Idler Sprocket 40A17 c/w 5/8" ID Ball Bearing c/w Snap Ring
3.36	Bottom Idler Sprocket Washer	1	ea.		H794	5/8" SAE Washer
3.7	Carriage Lift Chain	1	ea.		K627	Chain ANSI #40 Rivet Type - 315 Pitches Long + 2 Connecting Links + 1 Half Link
3.8	Carriage Lift Chain	0	ea.	Y	K118	Connecting Link ANSI #40
3.6	Carriage Lift Chain Attachment	1	ea.		C3325	Chain Attachment Bolt
3.9	Carriage Lift Chain Spring	1	ea.		V103	Compression Spring 0.78" OD x 1.58" Long
3.10	Carriage Lift Chain Attachment	1	ea.		H755	Hex Nut 1/2"-13UNC Grade 8 Plated
3.11	Carriage Lift Chain Attachment	1	ea.		H754	Jam Nut 1/2"-13UNC Plated
3.12	Film Carriage Anti-Fall Safety	1	ea.		F2117-R5	Anti-Fall Safety Latch
3.13	Film Carriage Anti-Fall Safety	1	ea.		H1302	Shoulder Screw 5/8" Dia. - 1.5" Long
3.18	Film Carriage Anti-Fall Safety	1	ea.		M1095	Latch Spacer 1/2" Long
3.19	Film Carriage Anti-Fall Safety	2	ea.		M1105	Latch Spacer 1/8" Long
3.29	Film Carriage Anti-Fall Safety	1	ea.		V175	Extension Spring 0.5" OD x 1.75" Long, Spring
3.30	Film Carriage Anti-Fall Safety	2	ea.		H1427	Button Head Socket Screw M6x1 - 20mm Long
3.31	Film Carriage Anti-Fall Safety	2	ea.		H820	Hex Nut M6x1 Plated
3.14	Tower Cover - Front	1	ea.		F2247	Tower Front Cover
3.15	Tower Cover - Elec. Panel Side	1	ea.		F2246-R2	Tower Electrical Panel Side Structure Support & Guard
3.16	Tower Cover - Carriage Side	1	ea.		F2248-R1	Tower Carriage Side Middle Cover
3.17	Tower Cover - Back	1	ea.		F2249-R2	Tower Back Cover
-	Tower Cover Mounting Hardware	11	ea.		H1393	Machine Screw Pan Head Phillips M5 - 10mm Long, Black Finish
-	Tower Cover Mounting	11	ea.		H1481	Lock-Washer M5 Screw Size, Black Finish
3.20	Bracket for 8mm Prox Sensor	1	ea.			Refer to Electrical portion of this Material List, under "Electrical Controls on Tower"
3.28	8mm Proximity Sensor	1	ea.			Refer to Electrical portion of this Material List, under "Electrical Controls on Tower"
3.23	Limit Switch Striker Mounting	1	ea.		C3230-82	Aluminum Extrusion 20mm x 10mm x 82.5 Long
3.34	Limit Switch Striker Rail	2	ea.		H1396	Flat Head Cap Screw M6 x 6mm Long
3.35	Limit Switch Striker Rail	2	ea.		H1557	Socket Head Cap Screw M6 x 6mm Long
3.21	Lower Limit Switch Striker	1	ea.		M850-R3	Limit Switch Striker - Lower
3.22	Upper Limit Switch Striker	1	ea.		M851-R4	Limit Switch Striker - Upper
3.24	Limit Switch Strikers	4	ea.		X234	Extrusion T-Nut Black Zinc M6
3.25	Limit Switch Strikers	4	ea.		H1395	Button Head Socket Screw M6 x 25mm Long
3.26	Control Panel					Refer to Electrical portion of this Material List, under "Control Panel Enclosure & Exterior"
3.27	Control Panel to Tower Cable	1	ea.		F1429-R3	Control Panel to Tower Cable Cover
3.32	Gear-Reducer Output Shaft	1	ea.		C3371-R1	Gearbox Shaft Stopper Angle
3.33	Cable Chain	1	ea.		E2884	Cable Chain 43 Pitches Long

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
2	SUPER RAPID THREAD II 20" PRESTRETCH - MECHANICAL ASSEMBLY - G2900-117-00-R6					
2.1	Carriage Weldment	1	ea.		G2900-117-01-00-R8	Super Rapid Thread II 20" Prestretch - Carriage Frame Weldment for 2100-SRT
2.33	Carriage Bottom Plate Extension	1	ea.		C3379	Carriage Bottom Plate Extension Weldment
2.66	Carriage Bottom Plate Extension Mtg. Screws	6	ea.		H1388	Button Head Socket Screw M6 - 12 mm Long
2.41	Prestretch Motor	1	ea.		F13	Prestretch Motor Flange Spacer Washer
2.2B	Prestretch Motor	1	ea.	Y	A460	Motor NEMA Type 71L/4-56C, 0.37kW - 1/2 HP 230/460 Volt 3 Phase 60 Hz. 1750 RPM TEFC UL/cCSAus, IP55
2.3	Motor Sprocket	1	ea.	Y	K150	Sprocket 40B9 x 5/8" Bore K2SS
-	Motor Sprocket Spacers	6	ea.		H833	Nylon Flat Washer 0.625" ID x 1.0" OD x 0.062"
2.4A	Roller #2 Bottom Sprocket	1	ea.		K502	Sprocket 40B28 x 22mm Bore K2SS
2.8	Prestretch Drive Chain	1	ea.	Y	K526	Chain ANSI #40 x 45 Pitches Long + Connecting Link
2.5	Roller #2 Top Sprocket	1	ea.	Y	K494	Sprocket 40B10 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 100%	0	ea.		K495	Sprocket 40B15 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 153%	0	ea.		K496	Sprocket 40B19 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 180%	0	ea.		K497	Sprocket 40B21 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 207%	1	ea.		K498	Sprocket 40B23 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 233%	0	ea.		K499	Sprocket 40B25 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 247%	0	ea.		K500	Sprocket 40B26 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 260%	0	ea.		K501	Sprocket 40B27 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 273%	0	ea.		K502	Sprocket 40B28 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 287%	0	ea.		K503	Sprocket 40B29 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 300%	0	ea.		K504	Sprocket 40B30 x 20mm Bore K2SS
2.6	Roller #1 Sprocket - 313%	0	ea.		K505	Sprocket 40B31 x 20mm Bore K2SS
2.62	Prestretch Roller Sprocket & Bearing Spacers	20	ea.		H1486	Nylon Flat Washer 0.81" ID x 1.48" OD x 0.062" Thick
2.60	Prestretch Ratio Chain Take-up Idler Sprocket Mount	1	ea.		C3166	Ratio Chain Tensioner Lever Weldment
2.81	Prestretch Ratio Chain Take-up Idler Sprocket Mount	1	ea.		H752	Hex Cap Screw M12x1.75 - 25mm Long, Plated
2.84	Prestretch Ratio Chain Take-up Idler Sprocket Mount	1	ea.		H1402	Lock Washer M12 Plated
2.82	Prestretch Ratio Chain Take-up Idler Sprocket Mount Adjusting Screw	1	ea.		H1389	Hex Cap Screw M8x1.25 - 40mm Long, Plated
2.83	Prestretch Ratio Chain Take-up Idler Sprocket Mount Adjusting Screw	1	ea.		H1214	Hex Nut M8x1.25
2.7A	Prestretch Ratio Chain Take-up Idler Sprocket	0	ea.		K227-1	Idler Sprocket 40A17 c/w 5/8" ID Ball Bearing
2.7B	Prestretch Ratio Chain Take-up Idler Sprocket	1	ea.	Y	K571	Idler Sprocket 40A17 c/w 5/8" ID Ball Bearing c/w Snap Ring
2.61	Prestretch Ratio Chain Take-up Idler Sprocket	1	ea.		H1403	Hex Cap Screw M16x2 - 35mm Long
2.85	Prestretch Ratio Chain Take-up Idler Sprocket	1	ea.		H833	Nylon Flat Washer 0.625" ID x 1" OD x 0.0625"
2.9	Prestretch Ratio Chain	1	ea.	Y	K526	Chain ANSI #40 x 45 Pitches Long + Connecting Link
2.10	Prestretch Roller #1	1	ea.		W322	Polyurethane Covered Roller c/w 20mm Shaft - 3" OD x 22" Long, Blue Compound
2.11	Prestretch Roller #2	1	ea.		W323	Polyurethane Covered Roller c/w 20mm Shaft - 4" OD x 22" Long, Blue Compound
2.87	Anti-Back-Rotation One-Way Bearing	1	ea.		C3533	One-Way Bearing Housing Weldment
2.89	Anti-Back-Rotation One-Way Bearing	1	ea.		B315	One-Way Bearing 20mm ID x 47mm OD x 14mm Wide c/w Inner Race Keyway

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
2.88	Anti-Back-Rotation One-Way Bearing	1	ea.		F2461	One-Way Bearing Housing Retainer Angle
2.86	Anti-Back-Rotation One-Way Bearing	1	ea.		H776	Lock Washer 5/16" (M8) Plated
2.51	Prestretch Roller Shaft Top Spacers	2	ea.		M1101	PVC Pipe Spacer 3.375" Long for Top of Prestretch Roller Shafts
2.12	Prestretch Roller Bearings	4	ea.		B301	Bearing 2-Bolt Flange c/w Pressed-Steel Housing 20mm ID
2.13	Nip & Diverter Rollers	2	ea.	Y	W223	Roller Aluminum 1.9" OD x 22.75" Long c/w 7/16" Hex Bore
2.14	Nip & Diverter Roller Axles	2	ea.		W329	Shaft 7/16" Hex x 26.69" Long c/w M8-1.25 Tapped Ends
2.50	Nip & Diverter Roller Axle	16	ea.		H1011	Nylon Round Spacer 1/2" ID x 3/4" OD x 3/8"
2.19	Film Diverter Rollers	2	ea.	Y	W330	Roller 0.75" Dia. Anodized Aluminum x 26.125" Long c/w 1/4" Dia. Spring-Loaded Axle 27.625" Long
2.21A	Dancer Roller Frame	1	ea.		C3742	Dancer Roller Frame Weldment 3.25" Radius
2.21B	Dancer Roller Frame	0	ea.		C5060	Dancer Roller Frame Weldment 3.25" Radius, Auto Film Cut
2.27	Dancer Pivot Bushing - Upper	1	ea.	Y	B299	Cast Bronze Flange Bearing 12mm ID x 16mm OD x 8mm Long c/w 23mm OD x 3mm Flange
2.28	Dancer Upper Pivot Bushing Retainer	1	ea.		Q183	Shaft Collar Steel 12mm ID c/w Set-Screw
2.48	Dancer Bar Pivot - Lower	1	ea.		H1373	Shoulder Screw 10mm Dia. x 20mm long, M8x1.25 Thread
2.53	Dancer Bar Pivot - Lower Spacer	1	ea.		H1330	Nylon Round Spacer 0.515" ID x 0.775" OD x 0.250" Long
2.26	Dancer Pivot Bushing - Lower	1	ea.	Y	B297	Sintered Bronze Flange Bearing 10mm ID x 13mm OD x 10mm Long c/w 16mm OD x 1.5mm Flange
2.17	Dancer Roller	1	ea.	Y	W324	Roller Aluminum 1.9" OD x 24.44" Long c/w 7/16" Hex Bore
2.18	Dancer Roller Axle	1	ea.	Y	W412	Shaft 7/16" Hex x 25.50" Long c/w M8-1.25 Tapped Ends
2.46	Dancer Roller	1	ea.		Q114	Shaft Collar Steel 1/2" ID c/w Set-Screw
2.55	Dancer Spring Mount - Stationary End	1	ea.		H1491	Shoulder Screw 6mm Dia. x 30mm long, M5x0.8 Thread
2.56	Dancer Spring Mount - Moving End	1	ea.		H1496	Shoulder Screw 6mm Dia. x 16mm long, M5x0.8 Thread
2.29	Dancer Bar Spring	1	ea.	Y	V166	Extension Spring 0.5" OD x .063 Wire x3.5" Lg
2.30	Dancer Bar Proximity Sensor Target Cam	1	ea.		M1074	Dancer Bar Proximity Sensor Target Cam
2.45	Carriage Frame	1	ea.		F4139	Cable Track Mounting Bracket
2.58	Dancer Bar Stops - Lower	2	ea.		H1214	Hex Nut M8x1.25
2.50	Dancer Bar Stops - Lower	4	ea.		H1011	Nylon Round Spacer 1/2" ID x 3/4" OD x 3/8" Thick
2.57	Dancer Bar Stops - Lower	2	ea.		H1455	Flat Head Socket Screw M8 - 35mm Long
2.52	Dancer Bar Stop - Upper	2	ea.		H1381	Hex. Cap Screw 8mm Dia. x 30mm long,
2.47	Dancer Bar Stop - Upper	4	ea.		H1353	Nylon Round Spacer 0.317" ID x 0.5" OD x 0.337" Long
2.31	Dancer Bar Proximity Sensor Mounting Bracket	1	ea.		F57-R1	Dancer Bar Proximity Sensor Mounting Bracket
2.72	Dancer Proximity Sensor	1	ea.			Refer to Electrical portion of this Material List, under "Electrical Controls on Film Carriage"
2.68	Auto Film Cut	0	ea.		C5057	Auto Film Cut Mechanism

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
2.22	Film Roll Mandrel Ass'y - 20" - consisting of:	1	ea.		G1700-007-00-R2	
2.22.1	Film Roll Spindle Bottom Chuck Bushing	1	ea.		M9-CM4	Film Roll Spindle Bottom Chuck Bushing
2.22.2	Film Roll Spindle Bottom Chuck	1	ea.		M9-CM3	Film Roll Spindle Bottom Chuck
2.22.3	Film Roll Spindle Top Chuck	1	ea.		M79	Film Roll Spindle Top Chuck
2.22.4	Film Roll Spindle Shaft	4	ea.		H764	Jam Nut 1" - 8NC
2.22.5A	Film Roll Spindle Shaft	1	ea.		H1463	Threaded Rod 1"-8UNC x 19.875" Long Plated
2.35	Prestretch Safety Door	1	ea.		C3193	Rapid Thread Prestretch Safety Door Weldment
2.36	Prestretch Safety Door Hinge	2	ea.		C3234	Prestretch Safety Door Hinge Pin
2.44	Prestretch Safety Door Stopper	1	ea.		F2102	Prestretch Safety Door Stopper
2.64	Prestretch Safety Door Stopper	1	ea.		RC598-2	Conveyor Clip-On Wear Strip 3/4" Wide x 2" Long
2.67	Prestretch Safety Door Stopper	1	ea.		F3109	Support Plate for Carriage Door Stopper
2.15	Prestretch Safety Door Nip Roller	1	ea.	Y	W325	Roller Aluminum 1.9" OD x 22" Long c/w 7/16" Hex Bore
2.16	Prestretch Door Nip Roller Axle	1	ea.		W326	Shaft 7/16" Hex x 22.26" Long c/w M8-1.25 Tapped Ends
2.37	Prestretch Safety Door Slam Latch	1	ea.	Y	X102	Rotary Slam Latch - Right-Hand
2.49	Prestretch Safety Door Latch	1	ea.		H842	Shoulder Screw 3/8" Dia. x 5/8" Long
2.54	Prestretch Safety Door Latch	1	ea.		H922	Top Lock Flange Nut 5/16"-18UNC
2.38	Prestretch Safety Door Handle	1	ea.		X103	Plastic Cabinet U-Handle
2.43	Prestretch Door Safety Switch	3	ea.		F2101	Shim Plate for Magnetic Safety Switch
2.73	Prestretch Door Safety Switch	1	ea.			<i>Refer to Electrical portion of this Material List, under "Electrical Controls on Film Carriage"</i>
2.39	Carriage Cover	1	ea.		F1935	Carriage Cover - Plastic for Switch Series Rapid Thread II Carriage Assembly
2.42	Film Threading Sub-Ass'y - consisting of:	1	ea.		C3556-R2	
2.42.1	Film Threading Drive Sprocket	1	ea.		C3165	Film Threading Drive Sprocket Weldment
2.42.6	Film Threading Drive Bearings	2	ea.		B102	Sintered Bronze Flange Bearing 1/2" ID x 5/8" OD x 3/8" Long c/w 7/8" OD x 1/8" TK Flange
2.42.11	Film Threading Drive Retainer	1	ea.		Q114	Shaft Collar Steel 1/2" ID c/w Set-Screw
2.42.9	Film Threading Drive Handle	1	ea.	Y	X231	Plastic Solid Disc Hand Wheel c/w Revolving Handle Type VPRA/M-80
2.42.3	Film Threading Idler Sprockets	2	ea.		K516	Sprocket 35B10 x 10mm Finished Bore
2.42.5	Film Threading Idler Sprockets	2	ea.		H1373	Shoulder Screw 10mm Dia. x 20mm long, M8-1.25 Thread
2.42.12	Film Threading Idler Sprockets	3	ea.		H775	Flat Washer 5/16" (M8) Bolt Size, Plated
2.42.17	Film Threading Idler Sprocket - Rear	1	ea.		H1459	Flanged Tooth Flange Lock Nut M8x1.25 Grade 8, Zinc Plated
2.42.18	Film Threading Idler Sprocket - Front	1	ea.		H1214	Hex Nut M8x1.25
2.42.4	Film Threading Idler Sprocket on Nip Roller Axle	1	ea.		K333	Sprocket 35B15 x 1/2" Finished Bore
2.42.10	Film Threading Idler Sprocket on Nip Roller Axle	7	ea.		H1011	Nylon Round Spacer 1/2" ID x 3/4" OD x 3/8" Thick
2.42.13	Film Threading Idler Sprocket on Nip Roller Axle	1	ea.		H776	Lock Washer 5/16" (M8) Plated
2.42.14	Film Threading Idler Sprocket on Nip Roller Axle	1	ea.		H1318	Nylon Spacer 1/2" ID x 11/16" OD x 1/16" Thick
2.42.16	Film Threading Idler Sprocket on Nip Roller Axle	1	ea.		H1399	Hex Cap Screw M8x1.25 - 20mm Long
2.42.7	Film Threading Chain	1	in.		K110	Roller Chain ANSI #35 (67 Pitches Long, without Connecting Link)
2.42.8	Film Threading Chain	1	ea.	Y	K331	Attachment Link for #35 Chain Type B1
2.42.2	Film Threading Chain	1	ea.	Y	F382-R3	Film Threading Attachment Hook
2.42.15	Film Threading Chain	1	ea.	Y	H1660	S.H.C.S #4-40 UNC x 1/4" Long

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
2.40	Carriage Carrier Plates Ass'y - consisting of:	1	ea.		C4109	
2.40.1	Carriage Guide Roller Carrier Plate - Free Side	1	ea.		C4111	Carriage Carrier Plate - Free Side
2.40.2	Carriage Guide Rollers	32	ea.	Y	B128	Ball Bearing 32mm OD x 12mm ID x 10mm W
2.40.3	Carriage Guide Roller Spacers	8	ea.		M1141	2-Bearing Middle Spacer (0.785" Long)
2.40.4	Carriage Guide Roller Spacers	8	ea.		M1142	Bearing End Spacer (0.378" Long)
2.40.5	Carriage Guide Roller Axle Bolt Spacers	12	ea.		H777	Flat Washer 7/16" SAE Plated 1/16" Thick
2.40.6	Carriage Guide Roller Axle Bolt - Front & Back	4	ea.		H1523	Socket Head Cap Screw M12 - 90mm Long
2.40.7	Carriage Guide Roller Axle Bolt - LH & RH Side	4	ea.		H1471	Hex Cap Screw M12 - 110mm Long Plated 8.8
2.40.8	Carriage Guide Roller Mounting Bolts	8	ea.		H1407	Nylon Insert Lock Nut M12
2.40.9	Carriage Guide Roller Axle Bolt Spacer Washer	4	ea.		H1524 (B134)	Flat Washer 1/2" ID x 15/16" OD x 0.031" Thick
2.23	Descent Obstruction Plate Safety Tray	1	ea.		F1968	Film Carriage Safety Tray
2.25	Descent Obstruction Plate Safety Tray	4	ea.		H1394	Button Head Socket Screw M5 - 20mm Long
2.32	Carriage Safety Limit Switch Mounting Plate	1	ea.		M1073	Carriage Safety Limit Switch Mounting Plate
2.24	Carriage Safety Limit Switch	1	ea.			<i>Refer to Electrical portion of this Material List, under "Electrical Controls on Film Carriage"</i>
2.34	Auto Load Height Sensing Photo-Eye Mounting Plate	1	ea.		F2205	Photo-Eye Angled Mounting Plate
2.71	1PE Auto Load Height Sensing Photo-Eye	1	ea.			<i>Refer to Electrical portion of this Material List, under "Electrical Controls on Film Carriage"</i>
2.70	2LS & 3LS Film Carriage Limit Switches	2	ea.			<i>Refer to Electrical portion of this Material List, under "Electrical Controls on Film Carriage"</i>

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
4	MODEL 2100-SRT ELECTRICAL CONTROLS					
	Electrical Drawing: E2100-188 Rev. 0A					
-	Control Panel Enclosure & Exterior					
-	Control Panel Enclosure Shell	1	ea.		E2293-A	Panel Enclosure Shell - 18" x 13" x 8" Deep c/w Special Piercing - Painted Cousins Gun-Metal Grey NEMA 4/12
-	Microprocessor control assembly - consisting of:	1	ea.		E2336	
-	Control Panel Enclosure Door	1	ea.		E2293-B	Panel Enclosure Door - 18" x 13" c/w Special Piercing - Painted Cousins Gun-Metal Grey c/w Poured Gasket NEMA 4/12
-	Microprocessor Control Board	1	ea.	Y	S315-R1	Microprocessor control board assembly for Switch Series Machines
-	Control Panel Door Keypad Label	1	ea.		S320	Keypad Label for Switch Series Machines, Custom 16x16

-	Microprocessor Control Board Fuse #F2	1	ea.	Y	E2266	Fuse 3 Amp 250V Time-Delay Type 5mm x 20mm RoHS Compliant
-	Microprocessor Control Board Fuse #F4	1	ea.	Y	E2266	Fuse 3 Amp 250V Time-Delay Type 5mm x 20mm RoHS Compliant
-	Microprocessor Control Board Fuse #F6	1	ea.	Y	E1806	Fuse 1 Amp 250V Fast-Blow Type 5mm x 20mm RoHS Compliant
-	Microprocessor Control Board Fuse #F9	1	ea.	Y	E2265	Fuse 4 Amp 250V Time-Delay Type 5mm x 20mm RoHS Compliant
-	Power Off - On - Reset Selector Switch	1	ea.	Y	E1965	Selector Switch Operator 3-Position Spring-Return Right to Center - Standard Knob
-	Power Off - On - Reset Selector Switch	1	ea.		E1939	Contact Block c/w Mounting Base 1 x N.O. & 1 x N.C.
-	Emergency Stop Push-Button	1	ea.	Y	E1812	Push-Pull Mushroom Head Button Red 40mm Diameter 2-Position Maintained
-	Emergency Stop Push-Button	1	ea.		E1813	Contact Block c/w Mounting Base 1 x N.C.
-	1CS - Connector Jumper Plug Ass'y - consisting of:	1	ea.	Y	S387	SWCB 1CS Jumper Plug - for Machine Without Remote Start
-	SWCB 1CS Connector	1	ea.			Connector Receptacle Female 8-Position 4.2mm Vertical Dual Row Mini-Fit Jr.
-	SWCB 1CS Connector	2	ea.		E2178-2	Connector Crimp Terminal Female 18-24AWG Tin-Plated Phosphor Bronze Mini-Fit Jr.
-	SWCB 1CS Connector	0.25	ft.		E174	Wire Type TR-64 #18 AWG/16 Strand Black (ft.)

-	Control Panel Cable Entry	6	ea.		E1877	Knock-Out Bushing SB875-11 Black - for 7/8" Dia. Hole c/w 0.687" ID, Suitable for Maximum 0.125" Panel thickness
-	Control Panel Cable Entry	0.4	ft.		E2215	Grommet Strip for 0.085" Max. Chassis Thickness - Extruded Serrated Polyethylene Type, Natural (100 ft. Roll)
-	Power Cord	1	ea.		E168	Strain Relief Connector 1/2" NPT 0.236"-0.472" Dia. - Black
-	Power Cord	1	ea.		E146	Lock Nut 1/2" Conduit
	Power Cord	1	ea.		E182	Power Cord Assembly 14-3 SJT x 12.5 ft. Long c/w 3-Pin Straight Male Plug on one end and other end blunt cut

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
-	Control Panel - Inner Panel					
-	Inner Panel	1	ea.		E2293-C	Control Panel Inner Panel c/w Special Piercing - 12 GA HRS 16.75" x 11-875" c/w Gloss White Paint
-	Wiring Harness	1	ea.		E2343	Control Panel Wiring Harness for 2100-SRT to Schematic E2100-188
-	1PS	1	ea.	Y	E2333	Power Supply 24VDC 0.6 amp Output, 90-264 VAC Input, Phaseo
-	MCR	1	ea.	Y	E1156-4	Relay 4PDT 15A c/w 24VDC Coil
-	MCR	1	ea.		E103-4	Relay Base 4-Pole for RPM41 Relay
-	MCR	1	ea.		E416	Diode General Purpose 400 PRV 1A DO-41
-	Relay Mounting Rail	0.113	2 m.		E474	DIN Rail 35mm x 7.5mm Symmetrical
-	1FU	1	ea.		E447	Fuse Holder 1-Pole, Dead Front, DIN-Rail Mounted, for Midget & Class 'CC' Fuses 600V 30A
-	1FU	1	ea.	Y	E448	Fuse 600 Volt 15 Amp Class HRCL-CC Dual-Element Time-Delay Type
-	5FU	1	ea.		E2239-2	Fuse-Holder Terminal Block for 5mm x 20mm Fuse, 2002 Series, Grey
-	5FU	1	ea.	Y	E1810	Fuse 2 Amp 250V Fast-Blow Low Breaking Type, IEC/SEMKO/CEE Certified for Europe 5mm x 20mm
-	1VFD	1	ea.	Y	E1569-2	Altivar 12 AC Variable Speed Drive 115 Volt 1 Phase 50/60 Hz Input - 1/2 HP 2.4A 230 Volt 3 Phase Output
-	2VFD	1	ea.	Y	E1569-2	Altivar 12 AC Variable Speed Drive 115 Volt 1 Phase 50/60 Hz Input - 1/2 HP 2.4A 230 Volt 3 Phase Output
-	3VFD	1	ea.	Y	E1569-2	Altivar 12 AC Variable Speed Drive 115 Volt 1 Phase 50/60 Hz Input - 1/2 HP 2.4A 230 Volt 3 Phase Output
-	Terminal Strip	2	ea.		E2232-2	Terminal Block 3-Position Cage Clamp Through Type, 2002 Series, Grey
-	Terminal Strip	2	ea.		E2233-2	Terminal Block 3-Position Cage Clamp Through Type, 2002 Series, Blue
-	Terminal Strip	1	ea.		E2234-2	Terminal Block End & Intermediate Plate for 3-Position Terminal Block, Type 2002 Series, Grey
-	Terminal Strip	2	ea.		E2235-2	Terminal Push-In Jumper Bar 2 Pole Type, 2002 Series, Light Grey
-	Terminal Strip	0.5	ea.		E2236-2	Terminal Markers 5mm, Blank - Card with 10 Strips of 10 Markers
-	Terminal Strip & Other DIN-Rail Devices	4	ea.		E2270	Terminal End Stop Screwless 6mm Wide, for 35mm Symmetrical DIN Rail

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
-	Electrical Controls on Machine Base					
1PX	1PX - Turntable Home Position Sensor	1	ea.	Y	E2166-3	Inductive Proximity Sensor QD Type 18mm Dia. Nickel-Plated Brass 24VDC PNP N.O. Flush 5mm Range c/w 4-Pin M12 Micro Connector
	1PX - Turntable Home Position Sensor Cable	1	ea.	Y	S333	
	Sensor Cable	1	ea.		E2106-3	QD Connector Cable DC 4-Wire M12 Micro Style Black PUR Insulated 90° - 5m Long
	SWCB 1PX Connector	1	ea.		E2168	Connector Receptacle Female 4-Position 4.2mm Vertical Dual Row Mini-Fit Jr.
	SWCB 1PX Connector	3	ea.		E2178-2	Connector Crimp Terminal Female 18-24AWG Tin-Plated Phosphor Bronze Mini-Fit Jr.

-	Electrical Controls on Machine Tower					
-	Turntable Motor	2.286	mtr.		E2230-1	Flexible Motor Supply Cable #18 AWG 4 Conductor (3 + Ground) Shielded c/w PVC Jacket (mtr.) (Olfex Type VFD Slim with "Lapp Surge Guard")
-	Film Carriage Elevator Motor	1.677	mtr.		E2230-1	Flexible Motor Supply Cable #18 AWG 4 Conductor (3 + Ground) Shielded c/w PVC Jacket (mtr.) (Olfex Type VFD Slim with "Lapp Surge Guard")
-	Turntable Motor - 1MTR	1	ea.		E168	Strain Relief Connector 1/2" NPT 0.236"-0.472" Dia. - Black
-	Film Carriage Elevator Motor - 2MTR	1	ea.		E168	Strain Relief Connector 1/2" NPT 0.236"-0.472" Dia. - Black
5PX	5PX - Carriage Height Pulse Sensor	1	ea.	Y	E1583-1	Inductive Proximity Sensor QD Type 8mm Dia. Nickel-Plated Brass 24VDC PNP N.O. Shielded 1.5mm Range c/w 4-Pin M12 Micro Connector
	5PX - Carriage Height Pulse Sensor	1	ea.		F1981-R2	Bracket for 8mm Prox Sensor on Tower
	5PX - Carriage Height Pulse Sensor Cable Assembly - consisting of:	1	ea.	Y	S381	
	5PX - Carriage Height Pulse Sensor	1	ea.		E2106-3	QD Connector Cable DC 4-Wire M12 Micro Style Black PUR Insulated 90° - 5m Long
	SWCB 5PX Connector	1	ea.		E2171	Connector Receptacle Female 3-Position 4.2mm Vertical Single Row Mini-Fit Jr.
	SWCB 5PX Connector	3	ea.		E2178-2	Connector Crimp Terminal Female 18-24AWG Tin-Plated Phosphor Bronze Mini-Fit Jr.

ITEM	LOCATION	QTY.	U/M	SP	COUSINS P/N	DESCRIPTION
-	Electrical Controls on Film Carriage					
-	Carriage Cable - Control	3.963	mtr.		E1615-1	Flexible Control Cable Type 190 #18 AWG 12 Conductor c/w Grey PVC Cover (mtr.)
-	Carriage Cable - 3MTR	3.658	mtr.		E1710-1	Flexible Control Cable Type 190 #18 AWG 4 Conductor Shielded c/w Grey PVC Cover (mtr.)
-	Carriage Cable - 3MTR	1	ea.		E168	Strain Relief Connector 1/2" NPT 0.236"-0.472" Dia. - Black
-	Carriage Cable	1	ea.		E469	Pipe Strap 3/8" EMT One-Hole
-	Carriage Cable	2	ea.		E234-1	Fixed Diameter Clamp 0.437" Dia. (P-CLIP)
-	Carriage Cable Chain (Standard Tower)	1	ea.		E2884	Cable Chain, Plastic 30.5mm Pitch x 75mm Radius, 36mm Wide x 23mm High - 43 Pitches Long c/w Mounting Brackets
1PE	1PE - Auto Load Height Sensing Photo-Eye	1	ea.	Y	E1661	Photo-Eye Adjustable Range Reflective Type 2.5m Range, 24 -240VAC/12-240VDC Supply, E-M Form-A Relay Output
	1PE - Auto Load Height Sensing Photo-Eye	2.5	ft.		E2127	Cable 4-Conductor 20 Gauge PVC or PUR Insulated
	1PE - Auto Load Height Sensing Photo-Eye Mounting Bracket	1	ea.			Refer to Mechanical portion of this Material List, under "Super Rapid Thread II 20" Prestretch Mechanical Assembly"
2LS	2LS - Film Carriage Elevator Top Limit Switch	1	ea.	Y	E1873	Limit Switch Side-Rotary c/w 30mm Radius Arm
3LS	3LS - Film Carriage Elevator Bottom Limit Switch	1	ea.	Y	E1873	Limit Switch Side-Rotary c/w 30mm Radius Arm
3PX	3PX - Dancer Proximity Sensor	1	ea.	Y	E488	Inductive Proximity Sensor 18mm Dia. 12-48VDC 0 - 10mA Analogue Output 0.8 - 8.0mm Sensing Distance
	3PX - Dancer Proximity Sensor Mounting Bracket	1	ea.			Refer to Mechanical portion of this Material List, under "Super Rapid Thread II 20" Prestretch Mechanical Assembly"
1DS	1DS - Rapid Thread Door Switch	1	ea.		E2184	Coded Magnetic Switch 2-Pole N/O + N/O (1 N/O Staggered)
4LS	4LS - Film Carriage Safety Switch	1	ea.	Y	E1663	Safety Switch c/w Straight Centered Rotary Lever - Plastic 2-Pole N/C + N/C Slow Break Contacts - PG11 Conduit Opening
	4LS - Film Carriage Safety Switch	1	ea.		E899	Strain Relief Connector w/o Locknut PG11 .200"-.394" DIA. - Black
	4LS - Film Carriage Safety Switch Mounting Plate	1	ea.			Refer to Mechanical portion of this Material List, under "Super Rapid Thread II 20" Prestretch Mechanical Assembly"
-	SWCB CARR Connector	1	ea.		E2227	Connector Receptacle Female 18-Position 4.2mm Vertical Dual Row Mini-Fit Jr.
-	SWCB CARR Connector	11	ea.		E2178-2	Connector Crimp Terminal Female 18-24AWG Tin-Plated Phosphor Bronze Mini-Fit Jr.

12:0

**C
O
M
P
O
N
E
N
T

M
A
N
U
A
L
S**

INSTRUCTION MANUAL

Photoelectric Sensor

Adjustable Range Reflective
EQ-500 Series

Thank you very much for using SUNX products. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

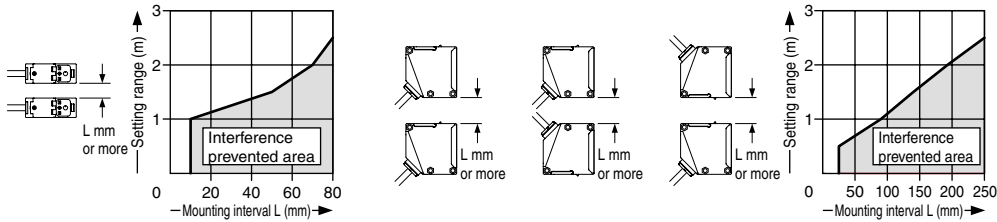


- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

1 SPECIFICATIONS

Type	Multi-voltage		DC-voltage	
	Model No.	Short sensing range	EQ-511	Short sensing range
Item	EQ-501	EQ-502	EQ-511	EQ-512
Adjustable range (Note 1) (Note 2)	0.2 to 2.5m	0.2 to 1.0m	0.2 to 2.5m	0.2 to 1.0m
Sensing range (Setting distance maximum) (Note 2)	0.1 to 2.5m	0.1 to 1.0m	0.1 to 2.5m	0.1 to 1.0m
Hysteresis (Note 2)	10% or less of operation distance			
Supply voltage	24 to 240V AC ± 10% or 12 to 240V DC ± 10% Ripple P-P 10% or less		12 to 24V DC ± 10% Ripple P-P 10% or less	
Power / Current consumption	AC: 4VA or less (With timer: 5VA or less) DC: 3W or less (With timer: 4W or less)		45mA or less	
Output	Relay contact 1a • Switching capacity: 250V AC 3A (resistive load) 30V DC 3A (resistive load) • Electrical life: 100,000 or more operations (switching frequency 1,200 times/hour) • Mechanical life: 50,000,000 or more operations (switching frequency 18,000 times/hour)		NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current) PNP open-collector transistor • Maximum source current: 100mA • Applied voltage: 30V DC or less (between output and +V) • Residual voltage: 1V or less (at 100mA source current) 0.4V or less (at 16mA source current)	
Output operation	Switchable either Detection-ON or Detection-OFF			
Short-circuit protection	—		Incorporated	
Response time	20ms or less (Depends on the timer setting period for EQ-50□T)		2ms or less (Depends on the timer setting period for EQ-51□T)	
Operation indicator	Orange LED (lights up when the output is ON)			
Stability indicator	Green LED (lights up under stable operating condition)			
Distance adjuster	2-turn mechanical adjuster with pointer			
Sensing mode	—		Switch either BGS or FGS function	
Timer function	EQ-50□T: Selectable from ON-delay and OFF-delay (0.1 to 5 sec. variable)			
Automatic interference prevention function	Incorporated (Note 3)			
Protection	IP67 (IEC)			
Ambient temperature	-25 to +55°C (No dew condensation or icing allowed), Storage: -30 to +70°C			
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH			
Emitting element	Infrared LED (modulated)			
Receiving element	2-segment photodiode			
Material	Enclosure: ABS, Front cover: Polycarbonate, Display cover: Polycarbonate			
Connection method	Screw-on terminal connection			
Cable	Suitable for round cable φ9 to φ11mm			
Cable length	Extension up to total 100m is possible with 0.3mm ² , or more, cable			
Weight	100g approx.		85g approx.	
Accessory	Adjusting screwdriver: 1 pc.			

- Notes: 1) The adjustable range stands for the maximum sensing range which can be set with the adjuster.
 2) The adjustable range, the sensing range and the hysteresis are specified for white non-glossy paper (200×200mm) as the object.
 3) When the sensors are mounted closely, use them in the interference prevented area, as shown below.



Note that the detection may be unstable depending on the mounting conditions or the sensing object. In the state where this product is mounted, be sure to check the operation with the actual sensing object to be used.

2 INFORMATION RELATING TO LOW VOLTAGE DIRECTIVE (Multi-voltage type only)

Item	Description
Referring standard	IEC 60947-5-2: 1998
Utilization category	AC-12/DC-12
Impulse withstanding voltage	2.5kV
Pollution degree	3
Frequency of operation cycle	25Hz
Turn off time	20ms
Excess gain	12%
Rated conditional protective device	100A
Short-circuit protective device	FUSE 5A FAST BLOW

Note: Each condition for use that the standards require is under less than 2,000m above sea level.

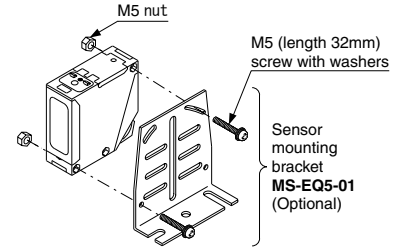
3 CAUTIONS

- Make sure that the power supply is off while wiring and adjusting.
- Take care that wrong wiring will damage the sensor.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.

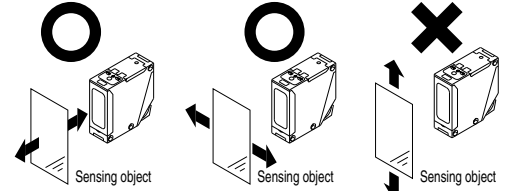
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- If an external surge voltage exceeding 4kV (DC-voltage: 1kV) is impressed, the internal circuit will be damaged, and a surge suppressing element should be used.
- Do not use during the initial transient time (50ms) after the power supply is switched on.
- This sensor is suitable for indoor use only.
- A mechanical structure is employed for the distance adjuster of this product. Take care not to drop the product.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in direct contact with water, or corrosive gas.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- This sensor cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the sensor.

4 MOUNTING

- The tightening torque should be 0.8N·m or less.

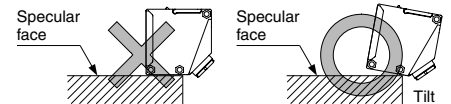


- Care must be taken regarding the sensor mounting direction with respect to the object's direction of movement.



- When detecting a specular object (aluminum or copper foil, etc.) or an object having a glossy surface or coating, please take care that there are cases when the object may not be detected due to a small change in angle, wrinkles on the object surface, etc.

- When a specular body is present below the sensor, use the sensor by tilting it slightly upwards to avoid wrong operation.



- If a specular body is present in the background, wrong operation may be caused due to a small change in the angle of the background body. In that case, install the sensor at an inclination and confirm the operation with the actual sensing object.

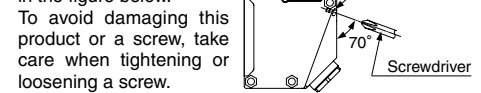
- This product is not easily affected by the reflected light intensity since this sensor is the adjustable range reflective type. When the reflected light intensity is remarkably low, the sensing range may be affected. In that case, mount the sensor, while checking light-up of the stable indicator (green).

- Mounting screws of the terminal cover and display cover should certainly be tightened to maintain the water tight rating, however, the tightening torque of the screws should be of 0.3 to 0.5N·m.

5 WIRING CONNECTIONS

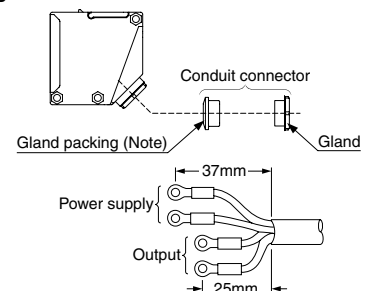
- Check all wiring before applying power since incorrect wiring may damage the internal circuit. Also, carefully tighten the terminal screws so that the wires of adjacent terminals do not touch.

- The mounting hole for screw the terminal cover inclines 70 degrees to the terminal cover, as shown in the figure below.



- To maintain a watertight performance, the cable should have an outer diameter between φ9 to φ11mm with a smooth covering material that allows the accessory conduit connector to be securely tightened, however, the tightening torque of the screw should be of 1.5 to 2.0N·m.

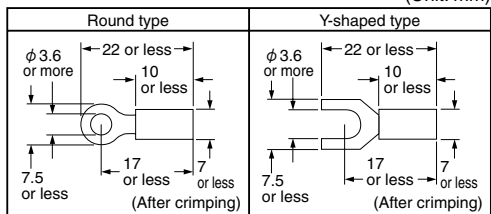
- Composition of a conduit connector, and processing of a cable



Note: When assembling the conduit connector, take care of the direction of the gland packing. Furthermore, in order to maintain a watertight performance, fit the gland packing such that the seating surface of the gland packing contacts the packing holder part of the terminal cover

- If pressure terminals are to be used, affix the connected pressure terminals to a terminal (M3.5 screw).
- **Dimensions of the suitable crimp terminals**

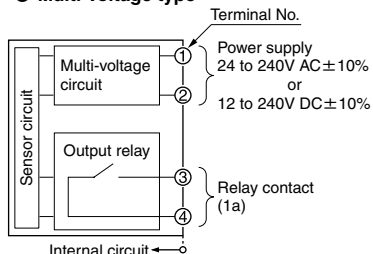
(Unit: mm)



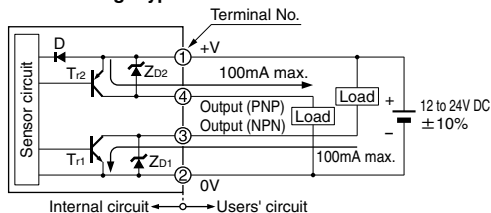
- The tightening torque of the terminal screws should be 0.3 to 0.5N·m.

6 I/O CIRCUIT DIAGRAMS

● Multi-voltage type

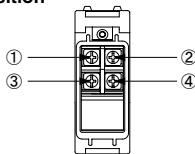


● DC-voltage type

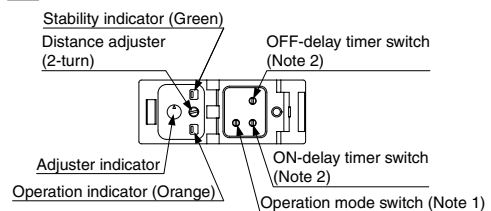


Symbols...D: Reverse supply polarity protection diode
Zd1, Zd2: Surge absorption zener diode
T1: NPN output transistor
T2: PNP output transistor

● Terminal position



7 PART DESCRIPTION



Notes: 1) The operation mode switch of the DC-voltage type is the DIP switch. Refer to '8 OPERATION MODE SWITCH' for details.
2) Incorporated on EQ-5□T only.

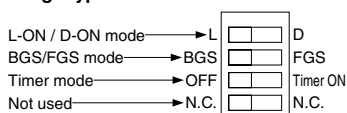
8 OPERATION MODE SWITCH

● Multi-voltage type (L-ON / D-ON mode only)

Operation mode switch	Description
	Detection-ON mode is obtained when the switch is turned fully clockwise.
	Detection-OFF mode is obtained when the switch is turned fully counter-clockwise.

Note: Turn the operation mode switch gradually and lightly with the attached screwdriver. If the distance adjuster is over turned or pressed heavily, it may be damaged.

● DC-voltage type



9 BGS/FGS FUNCTION (DC-voltage type only)

- This sensor incorporates BGS/FGS function. Select either BGS or FGS function depending on the positions of the background and sensing object. BGS/FGS function is set with the operation mode switch.
- Depends on a selection of either BGS or FGS function, the output operation changes as follows.

		Sensing range	Adjusted distance	Non-detectable area
BGS	L-ON			
	D-ON			
FGS	L-ON			
	D-ON			

<BGS function>

- This function is used when the sensing object is apart from the background.

<FGS function>

- This function is used when the sensing object contacts the background or the sensing object is glossy, etc.

10 DISTANCE ADJUSTMENT

For DC-voltage type, be sure to set the BGS/FGS function before distance adjustment. If the setting is done after the distance adjustment, the sensing area is changed.

- Turn the distance adjuster gradually and lightly with a screwdriver (please arrange separately). In order to protect itself, the distance adjuster idles if turned fully.

● Multi-voltage type, DC-voltage type · BGS select

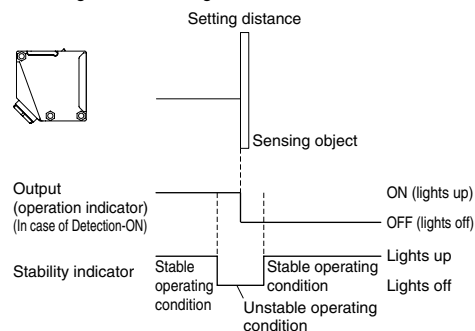
Step	Description	Distance adjuster
①	Turn the distance adjuster fully counterclockwise to the minimum sensing range position. (0.2m approx.)	
②	Please an object at the required distance from the sensor, turn the distance adjuster gradually clockwise, and find out point (A) where the sensor changes to the light received condition.	
③	Remove the object, turn the distance adjuster further clockwise, and find out point (B) where the sensor changes to the light received condition again with only the background. (When the sensor does not go to the light received condition even if the adjuster is fully turned clockwise, point (B) is this extreme point.)	
④	The optimum position to stably detect objects is the center point between (A) and (B).	

● DC-voltage type · FGS select

Step	Description	Distance adjuster
①	Turn the distance adjuster fully clockwise to the maximum sensing range position. (2.5m approx., 1.0m approx. for EQ-512□)	
②	In the state where the sensor detects the background, turn the distance adjuster gradually counterclockwise, and find out point (A) where the sensor changes to the undetecting condition.	
③	Place an object at the required distance from the sensor, turn the adjuster counterclockwise further until the sensor goes into the undetecting condition again. Once it has entered, turn the adjuster backward a little until the sensor returns to the detecting condition. That position is designated as point (B). (When the sensor does not go into the undetecting condition even if the adjuster is fully turned counterclockwise, the position where the adjuster was fully turned is regarded as the point (B).)	
④	The optimum position to stably detect objects is the center point between (A) and (B).	

11 STABILITY INDICATOR

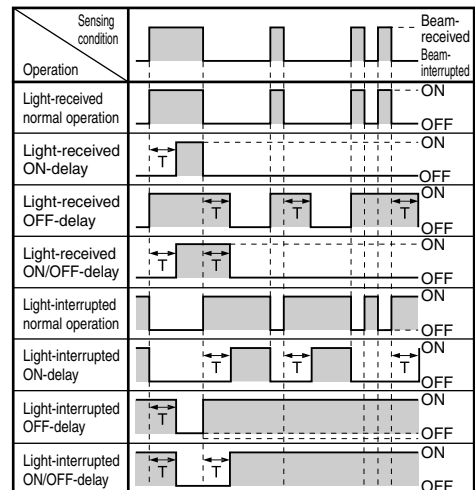
- Since the EQ-500 series use a 2-segment photodiode as its receiving element, and sensing is done based on the difference in the incident beam angle of the reflected beam from the sensing object, the output and the operation indicator (orange) operate according to the object distance. Further, the stability indicator (green) shows the margin to the setting distance.



12 TIMER FUNCTION (EQ-5□T only)

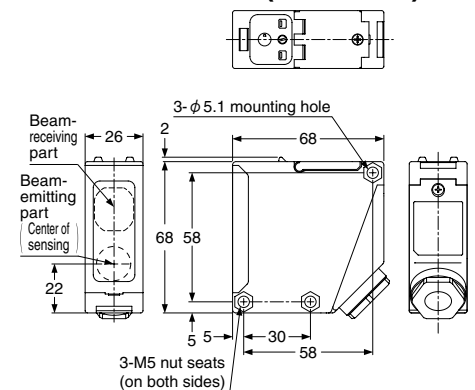
- An OFF-delay timer, which is useful when the response of the connected device is slow, etc., an ON-delay timer, which is useful when the input specifications of the connected device require a signal of a fixed width, are possible with EQ-5□T.
- The OFF-delay timer and the ON-delay timer can be used at the same time.
- For DC-voltage type, set the DIP switch for the timer selecting to 'Timer ON' side.

<Time chart>



Note: Turn the timer switch gradually and lightly with the attached screwdriver. If the distance adjuster is over turned or pressed heavily, it may be damaged.

13 DIMENSIONS (Unit: mm)



SUNX Limited <http://www.sunx.co.jp/>

Head Office
2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan
Phone: +81-(0)568-33-7211 FAX: +81-(0)568-33-2631
Overseas Sales Dept.
Phone: +81-(0)568-33-7861 FAX: +81-(0)568-33-8591



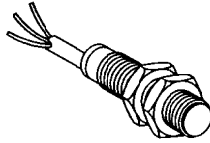
XS1-M / XS2-M / XS4-P Détecteurs de proximité analogiques / Analogue proximity sensors



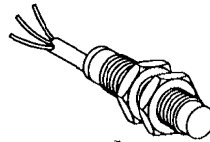
Telemecanique

Références / References

XS1-M12AB110/120
XS1-M18AB110/120
XS1-M30AB110/120



XS2-M12AB110/120
XS2-M18AB110/120
XS2-M30AB110/120
XS4-P12AB110/120
XS4-P18AB110/120
XS4-P30AB110/120



Caractéristiques électriques / Electrical characteristics

Type de détecteurs / Detector type	XS1-M / XS2-M / XS4-P DC 3 fils / 3 wires
Limites de tension / Supply voltage limits	XS...120 → 15...38V --- XS...110 → 15...58V ---
Courant commuté / Switching capacity	XS...120 → 4...20mA XS...110 → 0...10mA
Courant consommé sans charge / No load current consumption	≤ 4mA

Mise en œuvre / Setting up procedure

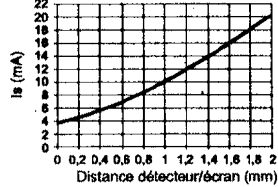
Domaine de fonctionnement / Operating range

XS1-M12...	→ 0,2...2 mm
XS2-M12...	→ 0,4...4 mm
XS4-P12...	→ 0,4...4 mm
XS1-M18...	→ 0,5...5 mm
XS2-M18...	→ 0,8...8 mm
XS4-P18...	→ 0,8...8 mm
XS1-M30...	→ 1...10 mm
XS2-M30...	→ 1,5...15 mm
XS4-P30...	→ 1,5...15 mm

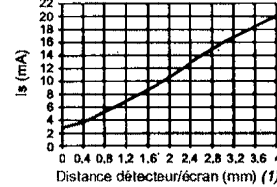
Produit	E (mm)	C (Nm)	e1 (mm)				e2 (mm)		e3 (mm)		e4 (mm)		H (mm)
			e1		e2		e3		e4				
XS1-M12	17	6	4		24		6		12		0		
XS2-M12	17	6	16		48		12		36		8		
XS4-P12	17	2	16		48		12		36		8		
XS1-M18	24	15	10		60		15		18		0		
XS2-M18	24	15	32		96		24		54		16		
XS4-P18	24	5	32		96		24		54		16		
XS1-M30	36	40	20		120		30		30		0		
XS2-M30	36	40	60		180		45		90		30		
XS4-P30	36	20	60		180		45		90		30		

Courbes de sortie / Output curves I_s = courant de sortie du détecteur / Output current

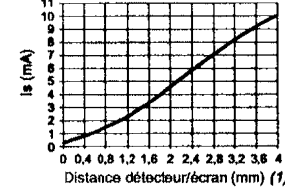
XS1-M12AB120 $S_n = 0,2...2$ mm



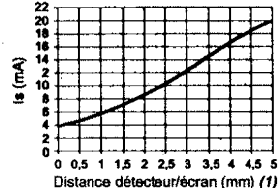
XS2-M/XS4-P12AB120 $S_n = 0,4...4$ mm



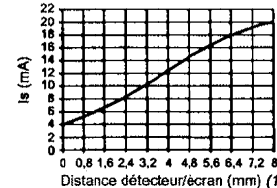
XS2-M/XS4-P12AB110 $S_n = 0,4...4$ mm



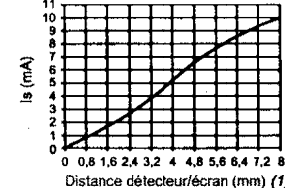
XS1-M18AB120 $S_n = 0,5...5$ mm



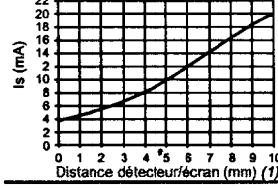
XS2-M/XS4-P18AB120 $S_n = 0,8...8$ mm



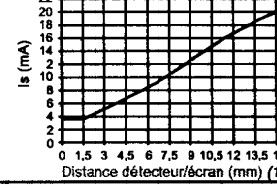
XS2-M/XS4-P18AB110 $S_n = 0,8...8$ mm



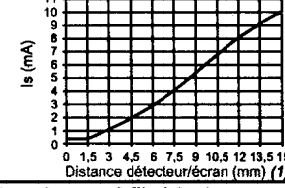
XS1-M30AB120 $S_n = 1...10$ mm



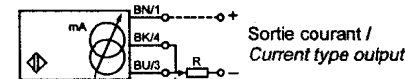
XS2-M/XS4-P30AB120 $S_n = 1,5...15$ mm



XS2-M/XS4-P30AB110 $S_n = 1,5...15$ mm



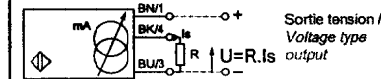
Branchement 2 fils / 2-wire type



Courant de sortie / Output current (2)	Valeur de R / Load value (R) (3)
XS...110 24V 4...14mA	≤ 640 Ω
XS...120 4...20mA	≤ 450 Ω
XS...110 48V 4...14mA	≤ 2350 Ω

Respecter une tension mini de 15V entre le + (borne 1) et le - (borne 3) du détecteur / the supply voltage between terminals 1 (+) and 3 (-) must be ≥ 15V

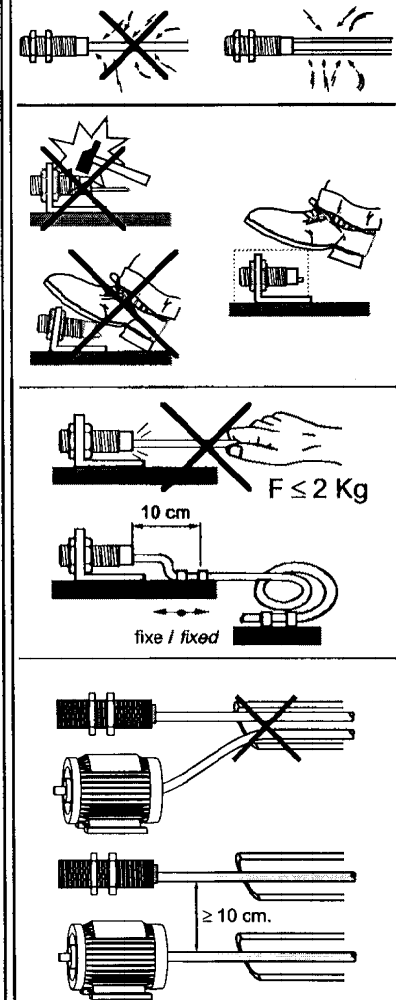
Branchement 3 fils / 3-wire type



Courant de sortie (2)	Valeur de R (3)
24V 0...10mA	≤ 1800 Ω
48V 0...16mA	≤ 1125 Ω
48V 0...10mA	≤ 4200 Ω

Respecter une tension mini de 5V entre le + (borne 1) et la sortie du détecteur (borne 4) / The supply voltage between terminals 1 (+) and the output terminal 4 must be ≥ 5V

PROTECTIONS



BU : bleu, blue, blau, blu, azul, bla, blauw, μ. λc
BN : brun, brown, marrón, castanho, brun, bruin, καφέ
BK : noir, black, schwarz, nero, negro, preto, svart, paupre

efector100

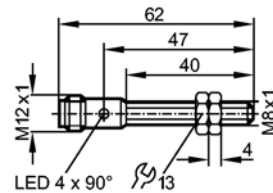


Inductive sensors

IE5318

IEK3002BBPKG/US
Inductive sensor
Metal thread M8 x 1
Quick disconnect

Sensing range 2 mm [f]
flush mountable

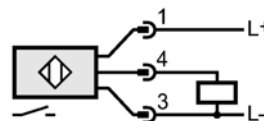


Made in Germany



Electrical design	DC PNP
Output	normally open
Operating voltage [V]	10...36 DC
Current rating [mA]	250
Short-circuit protection	Yes (non-latching)
Reverse polarity protection	yes
Overload protection	yes
Voltage drop [V]	< 1.6
Current consumption [mA]	< 15 (24 V)
Real sensing range (Sr) [mm]	2 ± 10 %
Operating distance [mm]	0...1.6
Switch-point drift [% of Sr]	-10...10
Hysteresis [% of Sr]	1...15
Switching frequency [Hz]	800
Correction factors	mild steel = 1 / stainless steel approx. 0.7 / brass approx. 0.5 / Al approx. 0.4 / Cu approx. 0.3
Ambient temperature [°C]	-25...70
Protection	IP 67, III
EMC	EN 60947-5-2 EN 55011: class B
MTTF [Years]	3491
Housing materials	brass white bronze coated; LCP
Function display	
Switching status LED	yellow (4 x 90°)
Connection	M12 connector
Weight [kg]	0.023
Remarks	cULus - Class 2 source required
Accessories (included)	2 lock nuts

Wiring



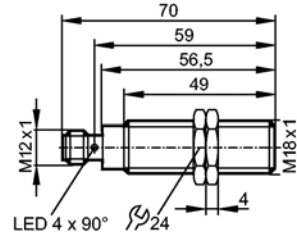
efector100



Inductive sensors

IGS212

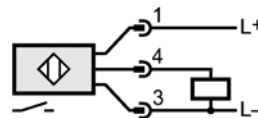
IGK3008BBPKG/M/US
 Inductive sensor
 Metal thread M18 x 1
 Quick disconnect
 Increased sensing range
 gold-plated contacts
 Sensing range 8 mm [f]
 flush mountable



Made in Germany

Electrical design	DC PNP
Output	normally open
Operating voltage [V]	10...36 DC
Current rating [mA]	100
Short-circuit protection	Yes (non-latching)
Reverse polarity protection	yes
Overload protection	yes
Voltage drop [V]	< 2.5
Leakage current [mA]	< 0.5
Current consumption [mA]	< 10
Operating distance [mm]	0...6.5
Hysteresis [% of Sr]	1...20
Switching frequency [Hz]	400
Correction factors	mild steel = 1 / stainless steel approx. 0.7 / brass approx. 0.5 / Al approx. 0.5 / Cu approx. 0.4
Ambient temperature [°C]	-25...70
Protection	IP 67, II
EMC	EN 61000-4-2 ESD: 4 kV CD / 8 kV AD EN 61000-4-3 HF radiated: 10 V/m (80...1000 MHz) EN 61000-4-4 Burst: 2 kV EN 61000-4-5 Surge: 0.5 kV EN 61000-4-6 HF conducted: 10 V (0.15...80 MHz) EN 55011: class B
MTTF [Years]	1689
Housing materials	brass white bronze coated; active face: PBT orange
Function display	yellow (4 x 90°)
Switching status LED	
Connection	M12 connector; gold-plated contacts
Weight [kg]	0.054
Accessories (included)	2 lock nuts

Wiring





Main

Range of product	Phaseo
Product or component type	Power supply
Power supply type	Regulated switch mode
Input voltage	100...240 V AC phase to phase, terminal(s): L1-L2 100...240 V AC single phase, terminal(s): N-L1 120...250 V DC
Output voltage	24 V DC
Rated power in W	15 W
Input protection type	Integrated fuse (not interchangeable)
Power supply output current	0.6 A
Output protection type	Against short-circuits Thermal
Ambient air temperature for operation	-25...70 °C without derating

Complementary

Input voltage limits	85...264 V
Network frequency	47...63 Hz
Inrush current	<= 20 A
Cos phi	> 0.5
Efficiency	> 80 %
Output voltage limits	22.2...28.8 V adjustable
Power dissipation in W	3.8 W
Current consumption	0.25 A at 240 V 0.4 A at 100 V
Line and load regulation	+/- 3 %
Residual ripple	250 mV
Holding time	>= 10 ms at 100 V >= 150 ms at 230 V
Connections - terminals	Screw type terminals for input connection, connection capacity: 2 x 0.14...2 x 2.5 mm ² AWG gauge26...14 Screw type terminals for output connection, connection capacity: 2 x 0.14...2 x 2.5 mm ² AWG gauge26...14
Marking	CE
Mounting support	35 x 15 mm symmetrical DIN rail 35 x 7.5 mm symmetrical DIN rail Panel 2 screws, diameter : 4 mm
Operating position	Vertical
Output coupling	Parallel Series
Name of test	Conducted emissions on the power line conforming to EN 55022 Class B Electrostatic discharges conforming to EN/IEC 61000-4-2 Emission conforming to EN 50081-1 Harmonic current emission conforming to EN/IEC61000-3-2 Induced electromagnetic field conforming to EN/IEC 61000-4-6 Primary outage conforming to IEC 61000-4-11 Radiated electromagnetic field conforming to EN/IEC 61000-4-3 Radiated emissions conforming to EN 55022 Class B Rapid transient conforming to IEC 61000-4-4 Surge conforming to EN/IEC 61000-4-5
Status LED	1 LED green for output voltage
Depth	59 mm

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

Height	100 mm
Width	60 mm
Product weight	0.1 kg

Environment

Product certifications	CCSAus CSA 22-2 No 950-1 C-Tick CULus 508 TUV 60950-1
Environmental characteristic	EMC conforming to EN 55022 Class B EMC conforming to EN 61000-6-3 EMC conforming to EN/IEC 61000-6-2 EMC conforming to EN/IEC 61204-3 Safety conforming to EN/IEC 60950-1 Safety conforming to SELV
IP degree of protection	IP20 conforming to EN/IEC 60529
Ambient air temperature for storage	-40...70 °C
Relative humidity	0...90 % during operation 0...95 % in storage
Class of protection against electric shock	Class II conforming to VDE 0106-1
Dielectric strength	3000 V between input and output
RoHS EUR status	Compliant
RoHS EUR conformity date	0501

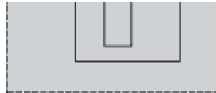
Regulated Switch Mode Power Supplies

Dimensions

	a in mm	a in in.	a1 in mm	a1 in in.
ABL8MEM05040	54	2.12	42	1.65
ABL8MEM12020	54	2.12	42	1.65
ABL8MEM24003	36	1.41	24	0.94
ABL8MEM24006	36	1.41	24	0.94
ABL8MEM24012	54	2.12	42	1.65
ABL7RM24025	74	2.91	60	2.36

Regulated Switch Mode Power Supply

Internal Wiring Diagram



Regulated Switch Mode Power Supplies

Series or Parallel Connection

Series Connection

(1) Two Schottky diodes I_{min} = power supply I_n and V_{min} = 50 V

Parallel Connection

Family	Series	Parallel
ABL 7RM/8MEM	2 products max.	2 products max.

Series or parallel connection is only recommended for products with identical references.

Regulated Switch Mode Power Supplies

Derating

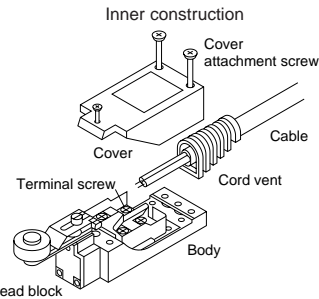
The ambient temperature is a determining factor that limits the power an electronic power supply can deliver continuously. If the temperature around the electronic components is too high, their life will be significantly reduced.

The nominal ambient temperature for the Modular range of Phaseo power supplies is 55°C. Above this temperature, derating is necessary up to a maximum temperature of 70°C (except for the ABL7RM24025 model).

The graph below shows the power as a percentage of the nominal power that the power supply can deliver continuously, depending on the ambient temperature.

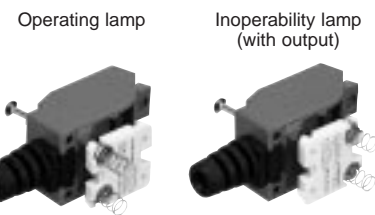
- X Maximum operating temperature (°C)
(1) With an ABL7RM24025
(2) With an ABL8MEM•••••

A compact and accurate vertical limit switch. Switches with indicator lamp available for convenient maintenance; either a neon AC powered lamp or an LED DC powered lamp.



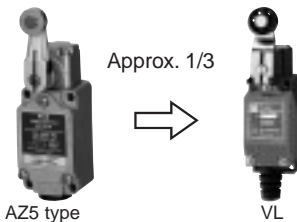
of the lamp holder attachment, it is possible to display both lights during inoperability and during operation (however, if both NO and NC loads are connected, only the inoperability lamp can be displayed.)

Construction permits lamp attachment method to be changed.



Characteristics

1. Compact design approximately 1/3 of the AZ5 limit switches



2. Gold-clad contacts provide reliable operation in low voltage circuits. Design minimizes contact chatter and bounce

The built-in switch has gold-clad contacts and uses a crossbar contact method for excellent reliability. It also has a dual cutoff circuit (1a1b contact) with little chattering and bouncing due to computer-operated analysis.

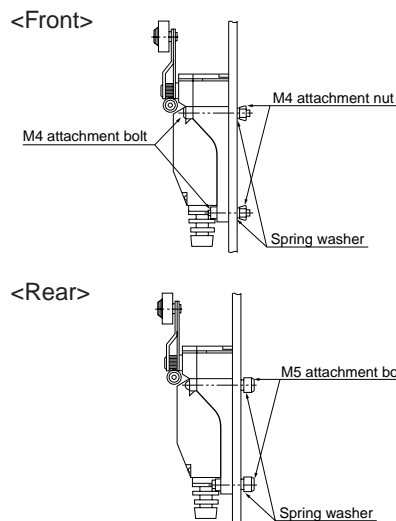
3. Easy wiring with full-open terminals

When the cover is removed, the terminals are fully accessible. Moreover, the wiring space is large despite the compact size, and the terminals are spread in a tiered array, so that wiring work can be completed very easily.

The cable can either be screwed in directly, or can use U-shaped and circular pressure terminals.



4. Mounting is possible from both front and back



5. Lamp type switches can be used with a wide range of voltages

- With neon lamp
Compatible with: **AC100 and 200V**; Even at AC 100V, sufficient luminosity is achieved through the diamond-cut lens. The lamp has a long lifespan of more than 20 thousand hours.
- With LED lamp
Covers 6 to 48V DC and comes in three types, **6V DC**, **12V DC**, **24 to 48V DC** Uses two highly luminescent LEDs and a diamond-cut lens.

6. Lamp connection can be either spring type or lead wire type

- Spring type (wiring unnecessary) (With neon or LED lamp type)
Wiring is unnecessary because the lamp is directly connected to the terminals. By simply changing the direction

• Lead wiring type <Current leakage 0>

(LED lamp type only)

Because the wiring can be made parallel to the load, current leakage from the lamp can be reduced to 0. Even with a slight leak, the electronic circuit incurring the leak can be used safely.

7. Dust-proof, waterproof, oil resistant construction

The main unit and the cover are sealed with rubber packing, and the cord runner is doubly sealed by the cord vent. The actuator is sealed by both a rubber cap and an O ring in all models. Also, the lens and cover are formed simultaneously with the lamp type, and moreover, a nameplate is affixed to the upper surface, thereby improving the already excellent waterproof capabilities.

(Note: Applications directly involving the cord entrance and the locations which are always wet and oily, or submersion in water or oil, cannot be used.)

TYPICAL APPLICATIONS

Ideal for general plant facilities such as engineering machinery, conveyer machinery, and assembly lines LED lamp type is also compatible with low-voltage DC control circuits such as in PCs and computers.

PRODUCT TYPE

1. Standard type

Actuator	Part No.
Push plunger	AZ8111
Roller plunger	AZ8112
Cross roller plunger	AZ8122
Roller arm	AZ8104
Adjustable roller arm	AZ8108
Adjustable rod	AZ8107
Flexible rod	AZ8166
Spring wire	AZ8169
Remote wire control plunger	AZ8181

Note) When ordering an overseas-specified product, refer to the Overseas Standards given below.

2. With Neon lamp

Lamp connection	Actuator	Lamp rating	Part No.
Spring type	Push plunger	100 to 200V AC	AZ811106
	Roller plunger		AZ811206
	Cross roller plunger		AZ812206
	Roller arm		AZ810406
	Adjustable roller arm		AZ810806
	Adjustable rod		AZ810706
	Flexible rod		AZ816606
	Spring wire		AZ816906
	Remote wire control plunger	AZ818106	

Note) When ordering an overseas-specified product, refer to the Overseas Standards given below.

3. With LED

Lamp connection	Actuator	Lamp rating	
		12V DC	24 to 48V DC
		Part No.	
Spring type	Push plunger	AZ8111161	AZ811116
	Roller plunger	AZ8112161	AZ811216
	Cross roller plunger	AZ8122161	AZ812216
	Roller arm	AZ8104161	AZ810416
	Adjustable roller arm	AZ8108161	AZ810816
	Adjustable rod	AZ8107161	AZ810716
	Flexible rod	AZ8166161	AZ816616
	Spring wire	AZ8169161	AZ816916
	Remote wire control plunger	AZ8181161	AZ818116
Lead wire type	Push plunger	AZ8111661	AZ811166
	Roller plunger	AZ81122661	AZ811266
	Cross roller plunger	AZ8122661	AZ812266
	Roller arm	AZ8104661	AZ810466
	Adjustable roller arm	AZ8108661	AZ810866
	Adjustable rod	AZ8107661	AZ810766
	Flexible rod	AZ8166661	AZ816666
	Spring wire	AZ8169661	AZ816966
	Remote wire control plunger	AZ8181661	AZ818166

Notes) 1. LED rating 6V DC type is available. When ordering, add suffix 162(spring type) or 662(lead wire type) to the standard part No.

2. The DC24-48V rated lamp is recommended for PC input use.

4. Option

	Application	Part No.
VL limit conduit adapter	VL, VL with lamp, VL-T	AZ8801

STANDARDS

Standard	Applicable product	Part No.
UL	File No. : E122222 Ratings : 5A 250V AC Pilot duty B300 Product type : Standard model, with neon lamp	Order by standard part No. However, add "9" to the end of the part No. for the model with neon lamp.
CSA	File No. : LR55880 Ratings : 5A 250V AC Pilot duty B300 Product type : Standard model, with neon lamp	
TÜV	File No. : J9551203 Ratings : AC-15 2A/250V upwards Product type : Standard model only	Order by standard part No.

SPECIFICATIONS

1. Contact Rating

1) Standard type

Rated control voltage	Load	Resistive load ($\cos \phi \approx 1$)	Inductive load ($\cos \phi \approx 0.4$)
125V AC		5A	3A
250V AC		5A	2A
125V DC		0.4A	0.1A

2) Type with indicator

Types	Rated control voltage	Resistive load ($\cos \phi \approx 1$)	Inductive load ($\cos \phi \approx 0.4$)
With Neon lamp	125V AC	5A	3A
	240V AC	5A	2A
With LED	24V DC	3A	—

2. Contact Characteristics

Contact arrangement	1 Form Z	
Initial contact resistance, max.	15m Ω (By voltage drop 6 to 8V DC at rated current)	
Contact material	Gold clad over silver	
Initial insulation resistance (At 500V DC)	Min. 100M Ω	
Initial breakdown voltage	1,000Vrms for 1 min Between non-consecutive terminals 2,000Vrms for 1 min Between dead metal parts and each terminal 2,000Vrms for 1 min Between ground and each terminal	
Shock resistance max.	In the free position	Max. 98m/s ² {10G}
	In the full operating position	Max. 294m/s ² {30G}
Vibration resistance	Standard type: Max. 55Hz Type with indicator: 10 to 50Hz, double amplitude of 1.5mm	
Expected life (Min. operations)	Mechanical	10 ⁷ (at 120 cpm)
	Electrical	3 \times 10 ⁵ (at rated resistive load) 5 \times 10 ⁶ (Magnetic contactor FC-100 200V AC load)
	Life of lamp	Min. 2 \times 10 ⁴ hours (Neon lamp type)
Ambient temperature/Ambient humidity	-20 to +60°C -4 to +140°F/Max. 95%	
Max. operating speed	120 cpm	

3. EN60947-5-1 performance

Item	Rating
Rated insulation voltage (Ui)	250VAC
Rated impulse withstand voltage (Uimp)	2.5kV
Switching overvoltage	2.5kV
Rated enclosed thermal current (Ithe)	5A
Conditional short-circuit current	100A
Short-circuit protection device	10A fuse
Protective construction	IP64
Pollution degree	3

4. Operating characteristics

Characteristics	O.F. (N {gf}) max.	R.F. (N {gf}) min.	Pretravel (P.T.), max. mm inch	Movement Differential (M.D.), max. mm inch	Overtravel (O.T.), min. mm inch	Totaltravel (T.T.), min. mm inch
Actuator						
Push plunger	8.83 {900}	1.47 {150}	1.5 .059	0.7 .028	4 .028	5.5 .217
Roller plunger						
Cross roller plunger						
Roller arm	5.88 {600}	0.49 {50}	20°	10°	75°	95°
Adjustable roller arm	7.84 {800}~3.35 {342}	0.49 {50}~0.21 {21}	20°	10°	75°	95°
Adjustable rod	7.84 {800}~1.99 {203}	0.49 {50}~0.12 {12}	20°	10°	75°	95°
Flexible spring wire	0.88 {90}	—	30 (1.181)	—	20 (.787)	50 (1.969)
Remote wire control plunger	19.61 {2,000}~ 24.52 {2,500}*	1.96 {200}~ 1.96 {200}*	1.5 .059 4 .157*	0.7 .028 2.0 .079*	4.5 .177 2.0 .079*	6 .236 6 .236*

*Characteristics measured at bent condition: min. radius 100mm 3.937inch.

Notes) 1. Keep the total travel values in the specified range. Otherwise the actuator force may rise to several times the operating force, resulting in a mechanical failure or much shorter service life.

2. For the operating characteristics, refer to the TECHNICAL INFORMATION.

5. Protective construction

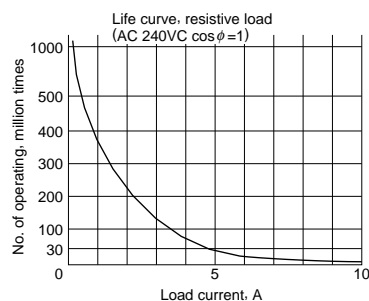
Protective construction	VL mini limit SW	VL mini limit SW (with indicator)
IEC		
IP60	○	○
IP64	○	○

6. Lamp rating

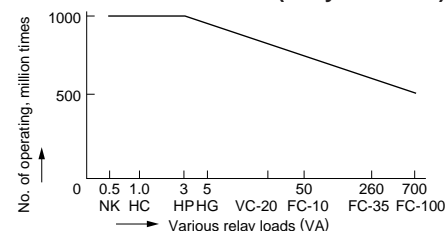
Types	Rated operating voltage	Operating voltage range	Internal resistor
Neon lamp	100 to 200V AC	80 to 240V AC	120k Ω
	6V DC	5 to 15V DC	2.4k Ω
LED	12V DC	9 to 28V DC	4.7k Ω
	24 to 48V DC	20 to 55V DC	15k Ω

DATA

1. Life curve



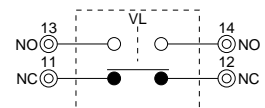
2. Actual load life curve (relay coil load)



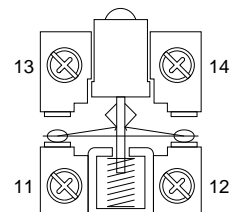
Note: The FC magnetic contactor series is 200V AC. The K is 2 Form C 24V DC type.

WIRING DIAGRAM

Output circuit



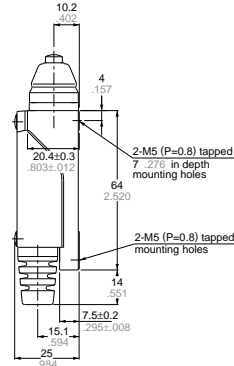
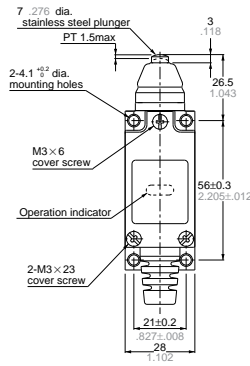
Terminal



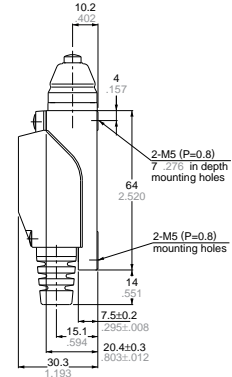
DIMENSIONS

- Push plunger type

Standard type



(Standard type)

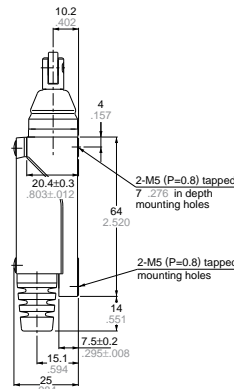
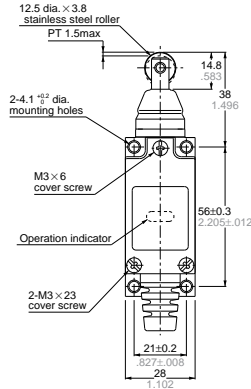


(With Neon lamp)

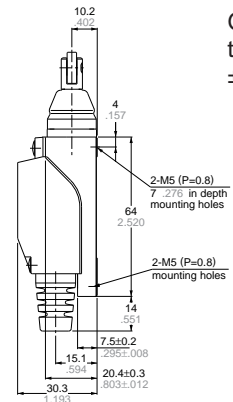
mm inch
General tolerance: ±0.4

- Roller plunger type

Standard type



(Standard type)

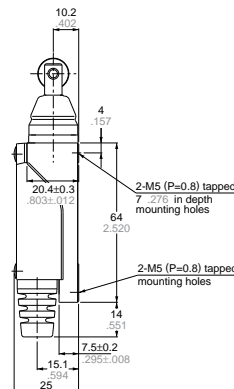
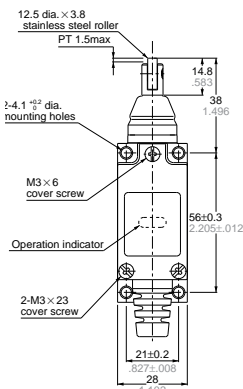


(With Neon lamp)

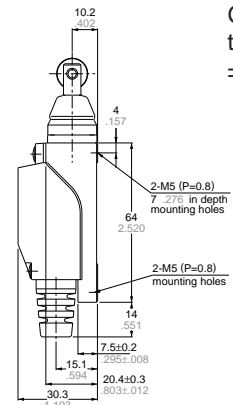
General tolerance: ±0.4

- Cross roller plunger type

Standard type



(Standard type)

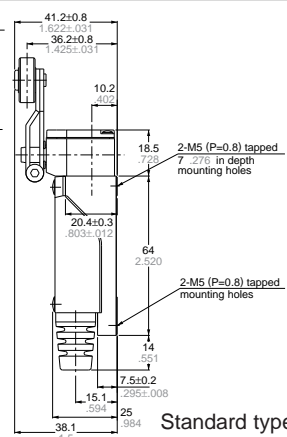
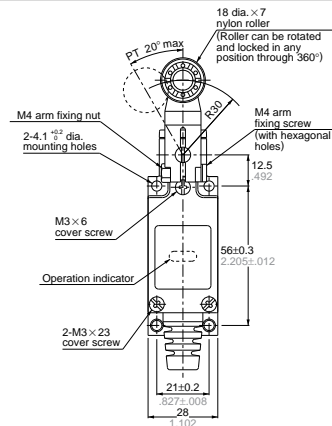


(With Neon lamp)

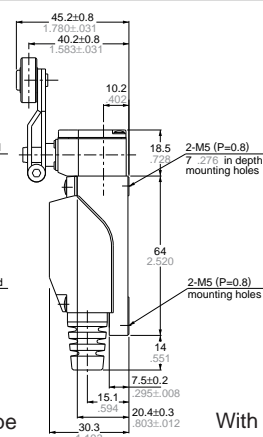
General tolerance: ±0.4

- Roller arm type

Standard type



Standard type



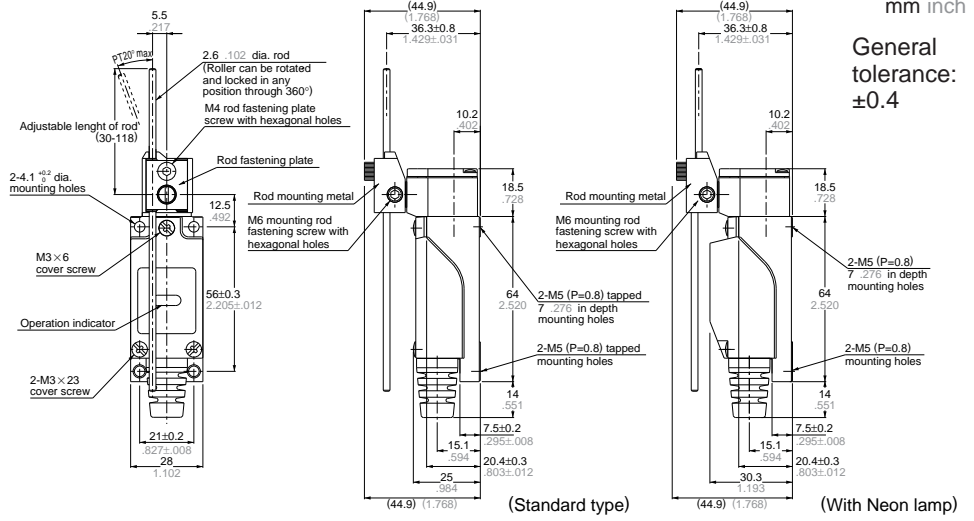
With lamp

General tolerance: ±0.4

VL (AZ8)

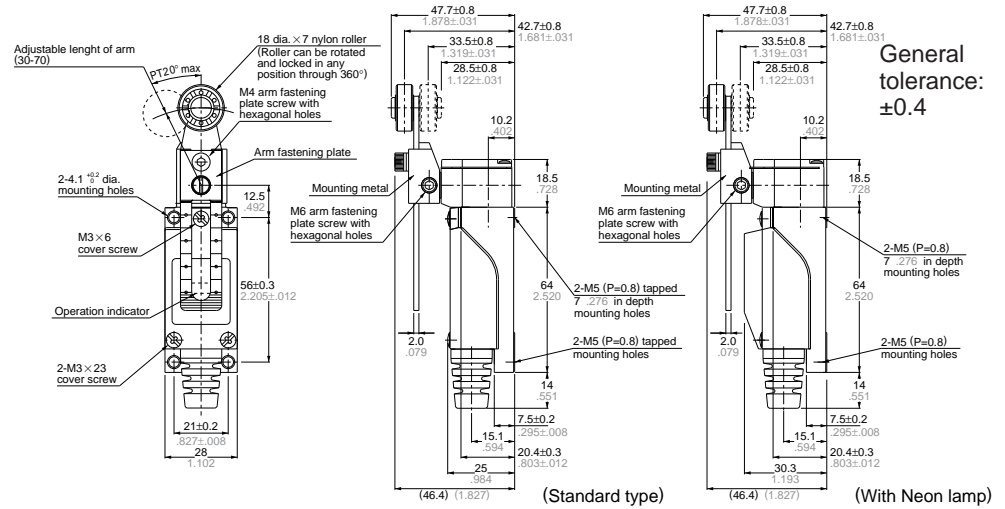
• Adjustable rod type

Standard type



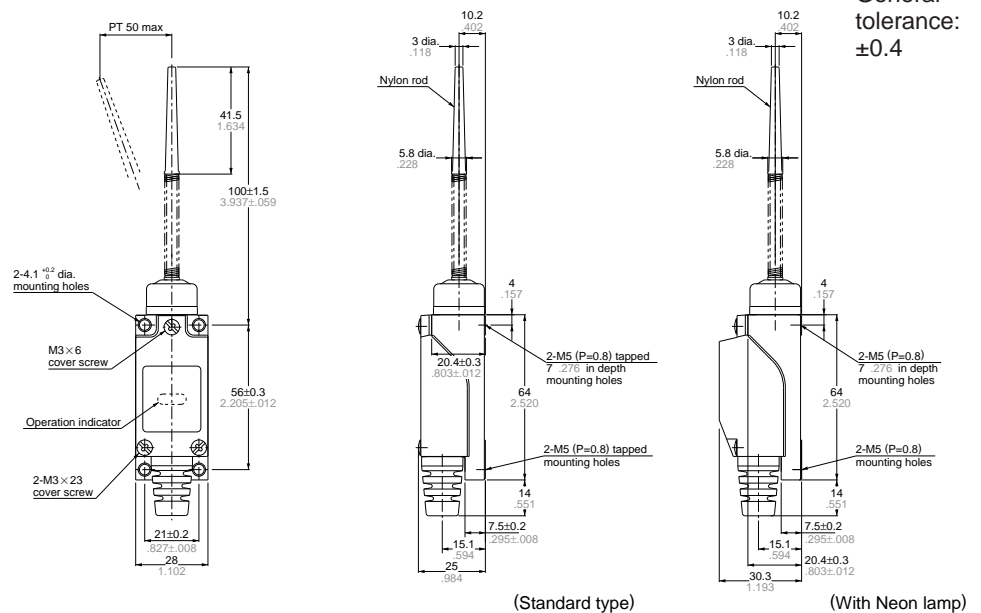
• Adjustable roller arm type (Length of arm can be adjustable within 30 to 70mm 1.181 to 2.756inch by 1mm .039inch pitch)

Standard type



• Flexible rod type (Should be used with less than 50mm 1.969inch of T.T.)

Standard type

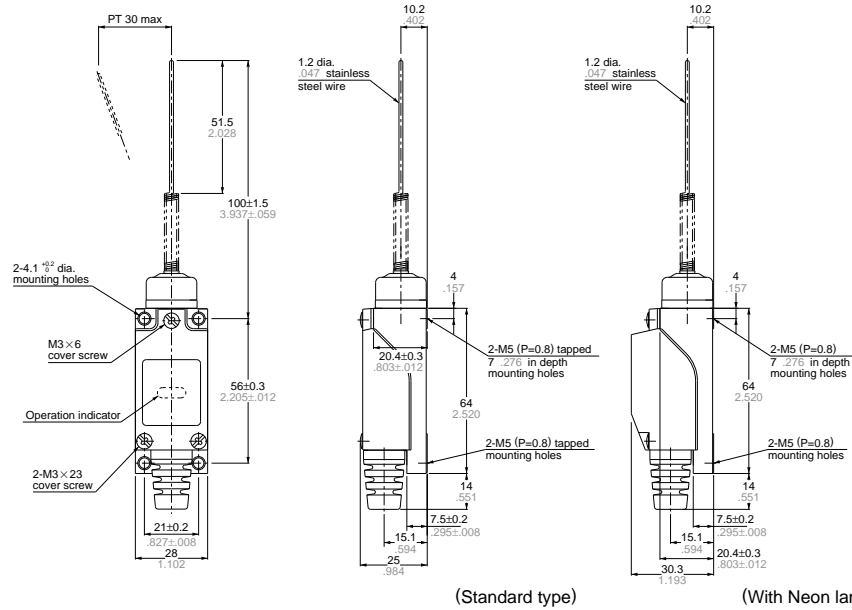


VL (AZ8)

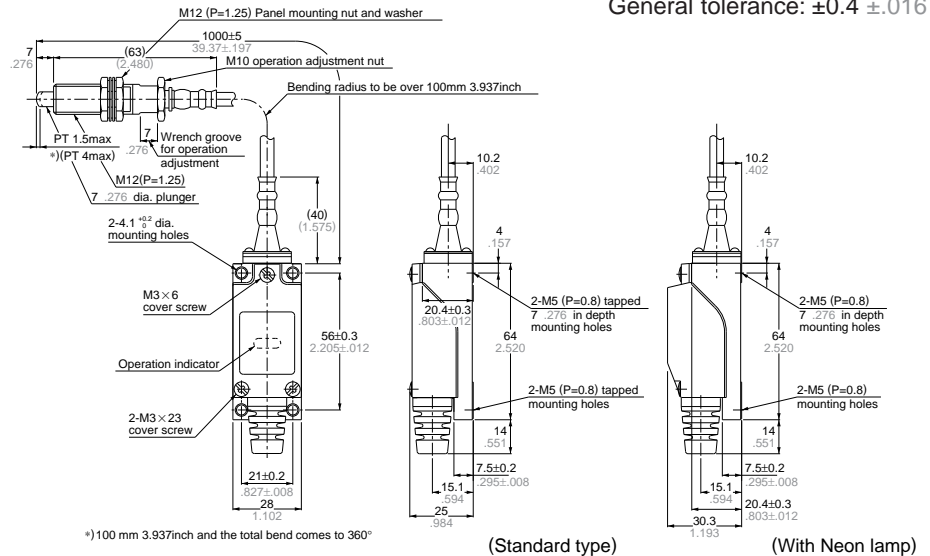
• Spring wire type should be used with less than 50mm 1.969inch of T.T.)

General tolerance: $\pm 0.4 \pm .016$

Standard type



• Remote wire control type



General tolerance: $\pm 0.4 \pm .016$

1. Mounting

- 1) Fasten a switch body
- 2) Temporarily fasten a wire
- 3) Fasten an actuator
- 4) Permanently fasten the wire when adjustment is complete

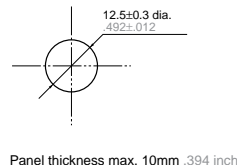
Note) When setting the operating position, it is recommended to adjust operation adjustment nut to keep safety margin for releasing.

2. Actuator

- 1) Make a hole (12.5±0.3mm .492±.012inch dia.) on the panel.
- 2) Fasten the actuator with a panel mounting nut and washer.

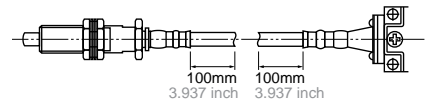
3. Remote wire

- 1) Use the wire in as straight a configuration as possible.



- 2) When the wire is bent, the radius should be a minimum of 100mm 3.937inch.

- 3) When fastening the wire to a support surface locate the fasteners at least 100mm 3.937inch from the end of the wire as shown below:



- 4) Use the least number of fastening points possible.
- 5) When the wire is fastened, use the rubber bushing to avoid a change in the diameter.
- 6) When the wire is bent, P.T., M.D. and O.T. can be adjustable as below;
 - P.T. = 2.5mm .098inch (max.)
 - M.D. = 1.5mm .059inch (max.)
 - O.T. = 3.5mm .138inch (min.)

VL (AZ8)

OPTION

VL Conduit Adapter



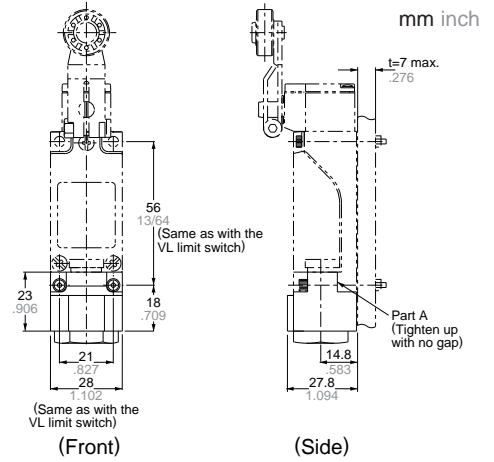
AZ8801

• Applicable wire

Electric wire name	Finished outside diameter
Vinyl cabtire cord (VCTF)	8.7 to 11 dia.
Vinyl cabtire cable (VCT)	.343 to .433 dia.



(A set of mounting hex. socket screws is supplied.)



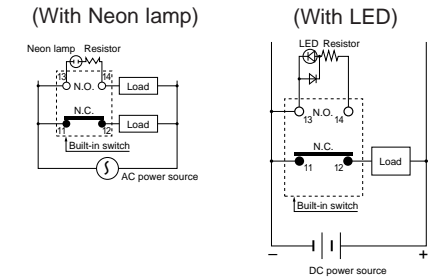
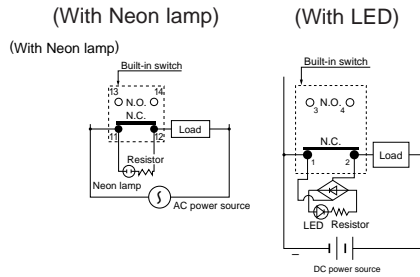
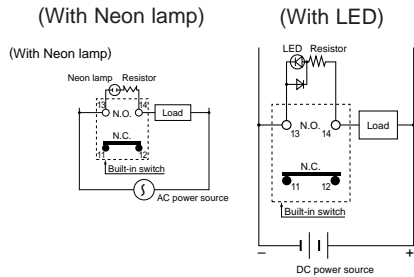
INDICATOR LIGHTING CIRCUIT

1. Spring type

1) When connecting a load to the N.O. side: When the switch is in the free position, the indicator is lit. When the switch operates, the indicator turns off. (With the indicator holder in the same position as shipped from the factory.)

2) When connecting a load to the N.C. side: When the switch is in the free position, the indicator is off. When the switch operates, the indicator turns on. (With the lamp holder position changed by 180° from the factory set position.)

3) When connecting loads to both N.O. and N.C. sides: Same as in 1). (With the lamp holder in the same position as shipped from the factory. In this case, the holder position cannot be changed.)

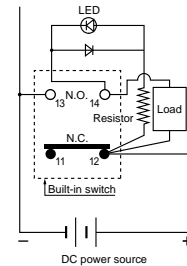


2. Lead wire type (only for switches with LED)

1) When giving indication on N.O. side or N.C. side, operation is the same as for the spring type. However, when the load is connected to both the N.O. side and N.C. side, indication can be given on both N.C. side and N.O. side.

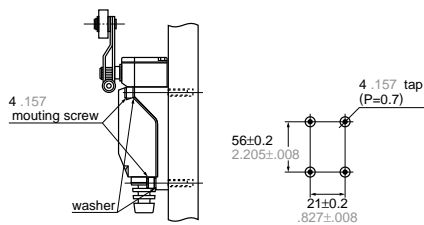
2) When the indication circuit is connected with load in parallel: Load performs the same operation as the indication circuit does. (When load operates, the lamp is lit, and when load is turned off, the lamp goes out.)

- More loads than for one circuit cannot be controlled.
- There is no leakage current.



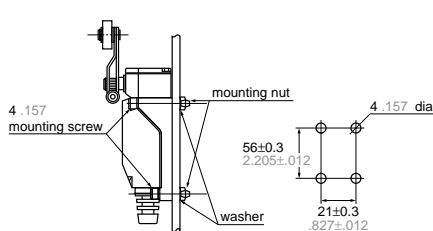
MOUNTING DIMENSIONS

Surface mounting



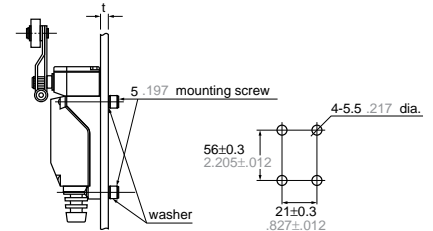
Depth of screw holes > 15mm .591inch

Through hole mounting



Thickness of panel < 5mm .197inch

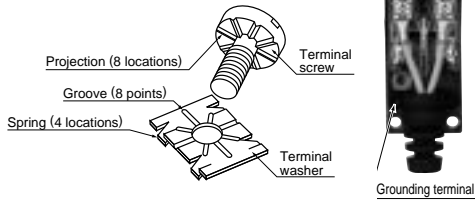
Rear mounting



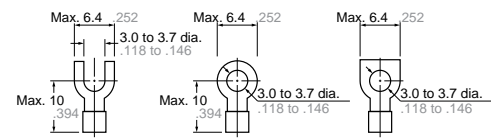
Length of bolt < panel thickness t+7mm

WIRING mm inch

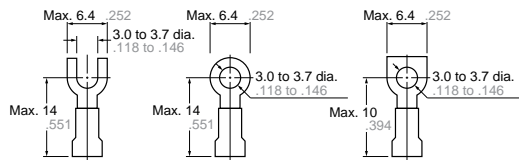
- Insulation distance more than 6.4mm .252inch for wiring and live parts
- Special assembly screws



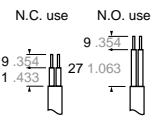
Applicable fasten terminal



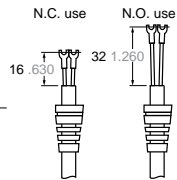
With insulated grip



Cable treatment Ordinary termi-



Fasten terminal



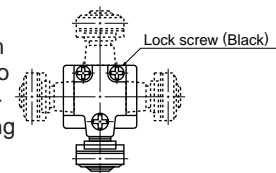
Applicable wire

Wire name	Applicable wire		
	Wire-strand	Conductor	Finished outside diameter
Vinyl cabtire cord (VCTF)	2-wire 3-wire 4-wire	0.75mm ² *1.25mm ² 2.0mm ² 0.75mm ² *1.25mm ²	Round shape 6 dia. to 9 dia.
Vinyl cabtire cable (VCT)	2-wire	0.75mm ²	
600V vinyl insulation sealed cable (VVF)	2-wire	1.0 dia. to 1.2 dia. 1.6 dia.	Flat shape Max. 9.4

Head direction change

(Roller arm, adjustable roller arm, adjustable rod types)

Actuator heads may be moved in 90° increments to any of four directions, by removing one screw.



CAUTIONS

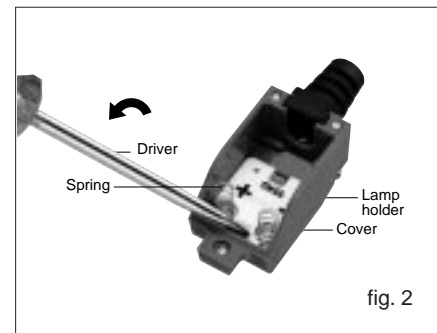
1. When overtravel is too large, life is shortened due to possible damage to the mechanism. Please use in the following appropriate range.

Types	Overtravel
Plunger (AZ8111, 8112, 8122)	1.5 to 2.0mm .059 to .079inch
Roller Arm (AZ8104, 8107, 8108)	20 to 30°
Flexible Rod (AZ8166, 8169)	15 to 20mm .591 to .787inch (at the top)

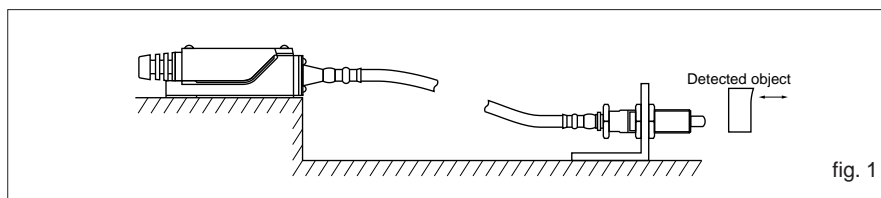
- 2. Because these switches are not of immersion protected construction, their use in water or oil should be avoided. Also, locations where water or oil can normally impinge upon the switch or where there is an excessive accumulation of dust should be avoided.
- 3. The use of these switches under the following conditions should be avoided. If the following conditions should become necessary, we recommend consulting us first.
 - Use where there will be direct contact with organic solvents, strong acids or alkalis, or direct exposure to their vapors.
 - Use where inflammable or corrosive gases exist.
- 4. In order to maintain the reliability at a high level under practical conditions of use, the actual operating conditions should be checked for the benefit of the quality of the product.

5. Remote wire control types (fig. 1): Because the main unit is not of water resistant or immersion-proof construction, their use in water or oil should be avoided. Also, locations where water or oil can normally impinge upon the switch or where there is an excessive accumulation of dust should be avoided. The main unit should be installed above the detection part in such case. (An actuator is immersion-protected construction.)

6. Mounting
Three cover screws should be fastened uniformly. The rubber for opening cord should be corrected as normal condition after connecting the wire.
7. How to change the indicator holder.
1) As shown in the photograph (fig. 2), insert a flatblade screw driver in the gap between the cover and the part of the indicator holder indicated by the arrow in the direction of insertion, and raise the lamp a little.
2) After removing the indicator holder, insert it in the reverse direction, and push it in until a snap is heard.
3) After changing the direction of the indicator holder, put the cover on it in such a way that the spring touches the top of the terminal screw.
(Unless the spring rests completely on the terminal screw, distortion of the spring, failure in lighting of the lamp or short circuit may result.)



8. Matters to be attended to in using spring type VL Limit Switch with indicator.
- 1) When loads are connected to both N.O. and N.C. only the indicator at non-operation time can be used.
 - 2) Take special care not to damage or deform the contact spring during change of indicator holder direction or during connection work.
 - 3) In the case of VL Limit Switch with Neon lamp, if the indicator is connected in series in a 100V circuit, the indicator ceases to be lighted. However, for a 200V circuit, up to 2 lamps can be connected in series.
9. Matters to be attended to in using lead wire type VL with lamp.
- 1) When loads are connected to both N.O. and N.C. indication can be given on both N.O. and N.C. sides, but it is impossible to connect the indication circuit to the load in series.





Main

Range of product	Preventa Safety detection
Product or component type	Coded magnetic switch
Component name	XCSDMC
Electrical connection	Pre-cabled
Cable length	2 m
Design	Rectangular, compact
Size	51 x 16 x 7 mm
Number of poles	2
Contacts type and composition	1 NO + 1 NO
Contacts operation	1 NO staggered

Complementary

Material	Plastic
Cable composition	4 x 0.25 mm ²
[Sa] assured operating distance	5 mm
[Sar] assured tripping distance	15 mm
Approach directions	3 directions
[Ue] rated operational voltage	24 V DC
[Ie] rated operational current	≤ 100 A
[Ui] rated insulation voltage	100 V DC
[Uimp] rated impulse withstand voltage	2,5 kV EN/IEC 60947-5-1
Resistance across terminals	10 Ohm
Short circuit protection	500 mA external cartridge fuse gG (gl)
Contacts material	Rhodium
Electrical durability	1200000 cycles
Maximum switching voltage	100 V DC
Switching capacity in mA	0,1... 100 mA
Insulation resistance	1000 MOhm
Breaking capacity	≤ 10 VA
Switching frequency	150 Hz
Enclosure material	Thermoplastic PBT
Cable material	PVC
Product weight	0,101 kg

Environment

Standards	CSA C22-2 No 14 EN/IEC 60204-1 EN/IEC 60947-5-1 EN/ISO 12100 UL 508
Product certifications	BG CSA UL
Protective treatment	TH
Ambient air temperature for operation	-25...85 °C
Ambient air temperature for storage	-40...85 °C
Vibration resistance	10 gn 10...150 Hz IEC 60068-2-6

Shock resistance	30 gn 11 ms IEC 60068-2-27
Sensitivity to magnetic fields	≥ 0,3 mT
Class of protection against electric shock	Class II IEC 60536
IP degree of protection	IP66 IEC 60529 IP67 IEC 60529
RoHS EUR conformity date	0729
RoHS EUR status	Compliant



S1A5614601

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this quick start guide before performing any procedure with this drive.
 - The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
 - Many parts of this drive, including the printed circuit boards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
 - **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
 - **DO NOT** short across terminals PA/+ and PC/- or across the DC bus capacitors.
 - Before servicing the drive:
 - Disconnect all power, including external control power that may be present.
 - Place a "DO NOT TURN ON" label on all power disconnects.
 - Lock all power disconnects in the open position.
 - **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge.
 - Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
 - If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive
 - Install and close all covers before applying power or starting and stopping the drive.
- Failure to follow these instructions will result in death or serious injury.**

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this product.

Information below is designed to use **single drive** connected to **single motor with a motor cable length less than 50 meters (164 ft)**. In any other case, consult the ATV12 user manual on www.schneider-electric.com. Check your cables before connecting the drive with motor (length, power, shielded or unshielded). Motor cable length is _____ (<50 meters, 164 ft)

1 Check the delivery of the drive

- Remove ATV12 from the packaging and check that it has not been damaged.

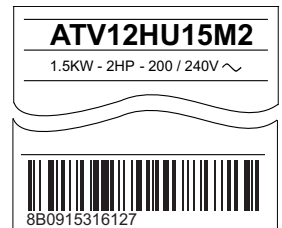
⚠️ WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

- Check that the drive reference printed on the label is the same as that on the delivery note corresponding to the purchase order.

Write the drive Model Reference: _____ and Serial Number: _____

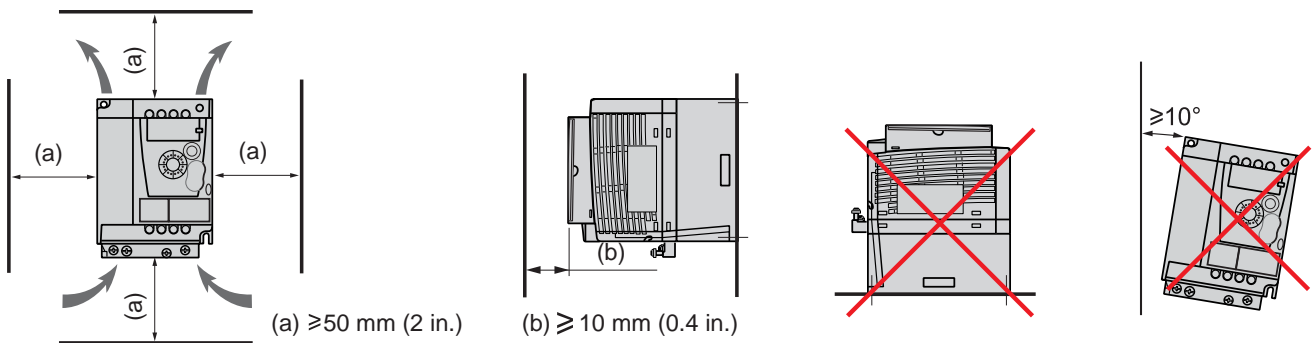


2 Check the line voltage compatibility

- Check that the **line voltage** is compatible with the supply range of the drive.
 Line voltage _____ Volts Drive voltage range _____ Volts
 Drive range: ATV12•••• F1 = 100 ... 120 V single phase / ATV12•••• M2=200 ... 240 V single phase / ATV12•••• M3 = 200 ... 240 V three-phase.

3 Mount the drive vertically

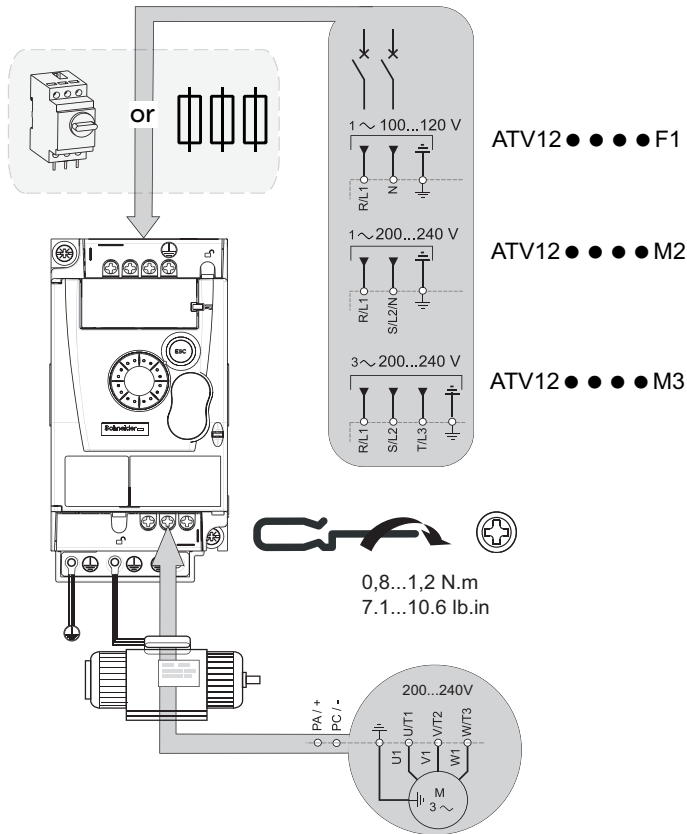
For a surrounding air temperature up to 50 °C (122 °F)



See user manual on www.schneider-electric.com for other thermal conditions.

4 Connect the drive: Power

- Wire the drive to the ground.
- Check circuit breaker rating or fuse rating.
- Check that the motor voltage is compatible with the drive voltage.
Motor voltage _____ Volts.
- Wire the drive to the motor.
- Wire the drive to the line supply.



6 Apply power to the drive

- Check that used Logic Inputs are not active (see Li1, Li2, Lix).
- Apply power to the drive.
- Drive displays **b F r** at first power up.
- On next start-ups, drive displays **r d y**.

7 Set motor parameters

- See on the motor Nameplate to set the following parameters.

Menu	Code	Description	Factory setting	Customer setting
[Motor control menu]	b F r	[Standard motor frequency]: Standard motor frequency (Hz)	50.0	
	n P r	[Rated motor power]: Nominal motor power on motor nameplate	drive rating	
	n C r	[Rated motor current]: Nominal motor current on motor nameplate (A)	drive rating	

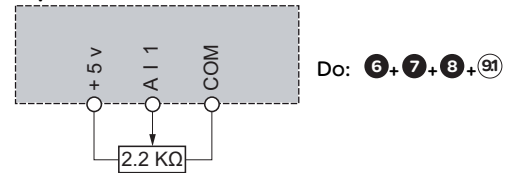
8 Set basic parameters

Menu	Code	Description	Factory setting	Customer setting
[CONFIGURATION]	A C C	[Acceleration]: Acceleration time (s)	3.0	
	d E C	[Deceleration]: Deceleration time (s)	3.0	
	L S P	[Low speed]: Motor frequency at minimum reference (Hz)	0.0	
	H S P	[High speed]: Motor frequency at maximum reference (Hz)	50.0	

5 Connect the drive: Control choice

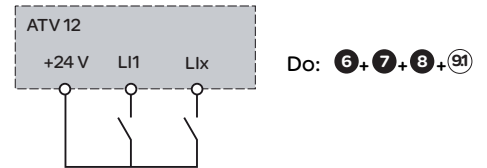
51 [REMOTE configuration] (Control by external reference)

- Wire the speed reference:



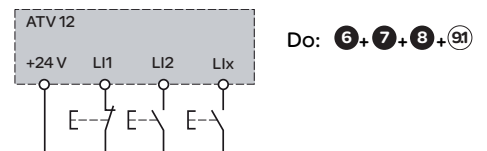
- Wire the command:
Control command 2-wire:
Parameter **t C C = 2 C**

L11: forward
Llx: reverse

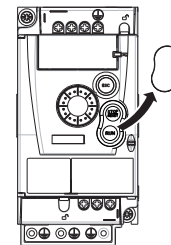


Control command 3-wire:
Parameter **t C C = 3 C**

L11: stop
L12: forward
Llx: reverse



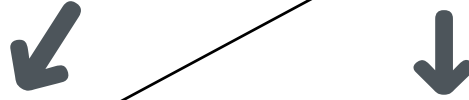
52 [LOCAL configuration] (control by internal reference).



Do: 6+7+8+92

9 Set control choice

Menu	Code	Description	5.1 [REMOTE configuration]	5.2 [LOCAL configuration]	Customer Setting
<i>COnF > FULL > CEI-</i> [Control menu]	<i>F r I</i>	[Reference channel]: Reference control	<i>A I I</i>	<i>A I U I</i>	
<i>COnF > FULL > I.O-</i> [Input Output menu]	<i>tCC</i>	[Type of control]: Command control	<i>2C</i> : 2-wire control <i>3C</i> : 3-wire control	—	



91 [REMOTE configuration] (configuration factory setting)

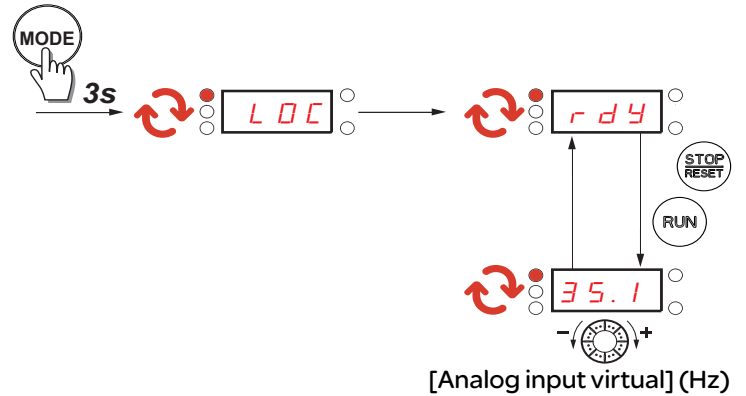
Parameters factory settings:

F r I = A I I
tCC = 2C

92 [LOCAL configuration]

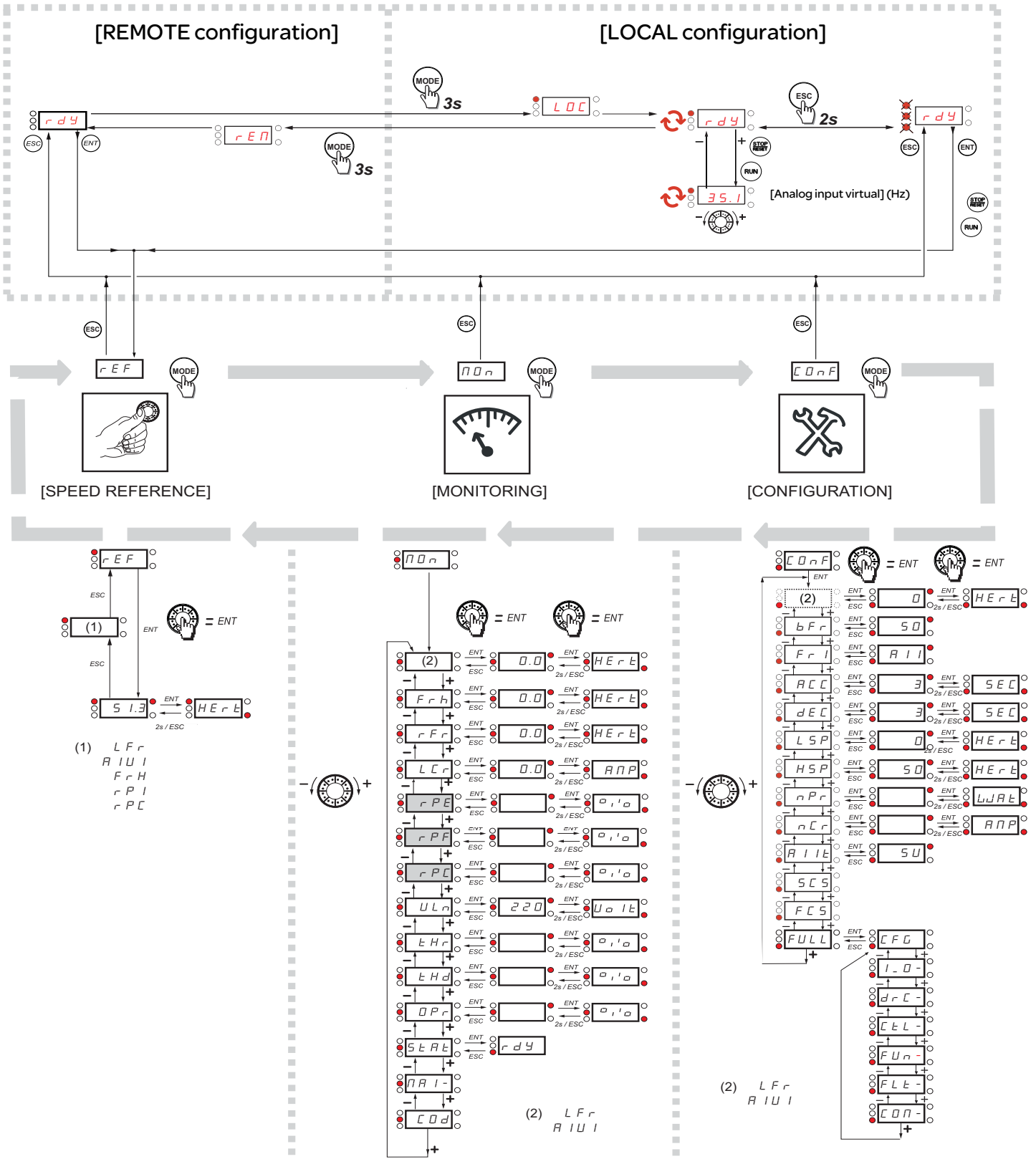
Parameters factory settings:

F r I = A I U I



10 Start the motor

Menus structure



Refer to the user manual for comprehensive menu description.

A dash appears after menu codes to differentiate them from parameter codes.
 Example: [Motor control menu] (`d r C -`), `b F r` parameter.

Diagnostics and Troubleshooting

Drive does not start, no error code displayed

- If the display does not light up, check the power supply to the drive (ground and input phases connection, see page [19](#)).
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the drive starting if the corresponding logic inputs are not powered up. The ATV12 then displays **n5t** in freewheel stop and **F5t** in fast stop, it will display **rdy** in freewheel stop. This is normal since these functions are active at zero so that the drive will be stopped safely if there is a wire break. Assignment of LI to be checked in **COnF/FULL/FUn-/5tE** - menu.
- Make sure that the run command input(s) is activated in accordance with the selected control mode (parameters **Type of control tCc** page [47](#) and **2 wire type control tCe** page [50](#), in **COnF/FULL/ I_0** - menu).
- If the reference channel or command channel is assigned to Modbus, when the power supply is connected, the drive displays "**n5t**" freewheel and remain in stop mode until the communication bus sends a command.
- In factory setting "RUN" button is inactive. Adjust parameters **Reference channel 1 Fr I** page [60](#) and **Command channel 1 Cd I** page [61](#) to control the drive locally (**COnF/FULL/CeL** - menu). See How to control the drive locally page [45](#).

Fault detection codes that cannot be reset automatically

The cause of the fault must be removed before resetting by turning off and then on.

SDF and **tNF** faults can also be reset remotely by means of a logic input (parameter **Detected fault reset assignment r5F** page [77](#) in **COnF/FULL/FLt** - menu).

InFb, **SDF** and **tNF** faults can be inhibited and cleared remotely by means of a logic input (parameter **Detected fault inhibition assignment InH** page [81](#)).

Code	Name	Possible causes	Remedy
CrF1	Precharge	<ul style="list-style-type: none"> • Charging relay control fault or charging resistor damaged 	<ul style="list-style-type: none"> • Turn the drive off and then back on again • Check the connections • Check the stability of the main supply • Contact your local Schneider Electric representative
InF1	Unknown drive rating	<ul style="list-style-type: none"> • The power card is different from the card stored 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF2	Unknown or incompatible power board	<ul style="list-style-type: none"> • The power card is incompatible with the control card 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF3	Internal serial link	<ul style="list-style-type: none"> • Communication fault between the internal cards 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF4	Invalid industrialization zone	<ul style="list-style-type: none"> • Inconsistent internal data 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InF9	Current measurement circuit failure	<ul style="list-style-type: none"> • Current measurement is not correct due to hardware circuit 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
- - - -	Problem of application Firmware	<ul style="list-style-type: none"> • Bad application firmware update using the Multi-Loader tool 	<ul style="list-style-type: none"> • Flash again the application firmware of the product
InFb	Internal thermal sensor failure	<ul style="list-style-type: none"> • The drive temperature sensor is not operating correctly • The drive is in short circuit or open 	<ul style="list-style-type: none"> • Contact your local Schneider Electric representative
InFE	Internal CPU	<ul style="list-style-type: none"> • Internal microprocessor fault 	<ul style="list-style-type: none"> • Turn the drive off and then back on again • Contact local Schneider Electric representative

Diagnostics and Troubleshooting

Fault detection codes that cannot be reset automatically (continued)

Code	Name	Possible causes	Remedy
D C F	Overcurrent	<ul style="list-style-type: none"> Parameters in the Motor control menu d r C - page 55 are not correct Inertia or load too high Mechanical locking 	<ul style="list-style-type: none"> Check the parameters Check the size of the motor/drive/load Check the state of the mechanism Connect line motor chokes Reduce the Switching frequency 5 F r page 57 Check the ground connection of drive, motor cable and motor insulation.
S C F 1	Motor short circuit	<ul style="list-style-type: none"> Short-circuit or grounding at the drive output Ground fault during running status Commutation of motors during running status Significant current leakage to ground if several motors are connected in parallel 	<ul style="list-style-type: none"> Check the cables connecting the drive to the motor, and the motor insulation Connect motor chokes
S C F 3	Ground short circuit		
S C F 4	IGBT short circuit	<ul style="list-style-type: none"> Internal power component short circuit detected at power on 	<ul style="list-style-type: none"> Contact your local Schneider Electric representative
S O F	Overspeed	<ul style="list-style-type: none"> Instability Overspeed associated with the inertia of the application 	<ul style="list-style-type: none"> Check the motor Overspeed is 10% more than Maximum frequency E F r page 55 so adjust this parameter if necessary Add a braking resistor Check the size of the motor/drive/load Check parameters of the speed loop (gain and stability)
E n F	Auto-tuning	<ul style="list-style-type: none"> Motor not connected to the drive One motor phase loss Special motor Motor is rotating (being driven by the load, for example) 	<ul style="list-style-type: none"> Check that the motor/drive are compatible Check that the motor is present during auto-tuning If an output contactor is being used, close it during auto-tuning Check that the motor is completely stopped

Diagnostics and Troubleshooting

Fault detection codes that can be reset with the automatic restart function, after the cause has disappeared

These faults can also be reset by turning on and off or by means of a logic input (parameter [Detected fault reset assignment](#) $r5F$ page 77). OHF, OLF, OPF1, OPF2, OSF, SLF1, SLF2, SLF3 and tJF faults can be inhibited and cleared remotely by means of a logic input (parameter [Detected fault inhibition assignment](#) InH page 81).

Code	Name	Possible causes	Remedy
$LFFI$	AI current lost fault	Detection if: <ul style="list-style-type: none"> Analog input AI1 is configured as current AI1 current scaling parameter of 0% $CrLI$ page 51 is greater than 3 mA Analog input current is lower than 2 mA 	<ul style="list-style-type: none"> Check the terminal connection
ObF	Overbraking	<ul style="list-style-type: none"> Braking too sudden or driving load too high 	<ul style="list-style-type: none"> Increase the deceleration time Install a module unit with a braking resistor if necessary Check the line supply voltage, to be sure that it is under the maximum acceptable (20% over maximum line supply during run status)
OHF	Drive overheat	<ul style="list-style-type: none"> Drive temperature too high 	<ul style="list-style-type: none"> Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting. See Mounting and temperature conditions page 12.
OLC	Process overload	<ul style="list-style-type: none"> Process overload 	<ul style="list-style-type: none"> Check the process and the parameters of the drive to be in phase
OLF	Motor overload	<ul style="list-style-type: none"> Triggered by excessive motor current 	<ul style="list-style-type: none"> Check the setting of the motor thermal protection, check the motor load.
$OPF1$	1 output phase loss	<ul style="list-style-type: none"> Loss of one phase at drive output 	<ul style="list-style-type: none"> Check the connections from the drive to the motor In case of using downstream contactor, check the right connection, cable and contactor
$OPF2$	3 output phase loss	<ul style="list-style-type: none"> Motor not connected Motor power too low, below 6% of the drive nominal current Output contactor open Instantaneous instability in the motor current 	<ul style="list-style-type: none"> Check the connections from the drive to the motor Test on a low power motor or without a motor: In factory settings mode, motor phase loss detection is active Output Phase loss detection OPL page 80 = 4E5. To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive, deactivate motor phase loss detection Output Phase loss detection $OPL = n0$ Check and optimize the following parameters: IR compensation (law U/F) UFr page 56, Rated motor voltage $Un5$ page 55 and Rated motor current nCr page 55 and perform an Auto-tuning tUn page 58.
OSF	Main overvoltage	<ul style="list-style-type: none"> Line voltage too high: <ul style="list-style-type: none"> At drive power on only, the supply is 10% over the maximum acceptable voltage level Power with no run order, 20% over the maximum line supply Disturbed line supply 	<ul style="list-style-type: none"> Check the line voltage

Diagnostics and Troubleshooting

Fault detection codes that can be reset with the automatic restart function, after the cause has disappeared (continued)

Code	Name	Possible causes	Remedy
PHF	Input phase loss	<ul style="list-style-type: none"> • Drive incorrectly supplied or a fuse blown • Failure of one phase • 3-phase ATV12 used on a single-phase line supply • Unbalanced load • This protection only operates with the drive on load 	<ul style="list-style-type: none"> • Check the power connection and the fuses. • Use a 3-phase line supply. • Disable the fault by setting Input Phase loss detection IPL page 80 = n0.
SCF5	Load short circuit	<ul style="list-style-type: none"> • Short-circuit at drive output • Short circuit detection at the run order or DC injection order if parameter IGBT test S t r t page 81 is set to YES 	<ul style="list-style-type: none"> • Check the cables connecting the drive to the motor, and the motor's insulation
SLF1	Modbus communication	<ul style="list-style-type: none"> • Interruption in communication on the Modbus network 	<ul style="list-style-type: none"> • Check the connections of communication bus. • Check the time-out (Modbus time out t t 0 parameter page 83) • Refer to the Modbus user manual
SLF2	SoMove communication	<ul style="list-style-type: none"> • Fault communicating with SoMove 	<ul style="list-style-type: none"> • Check the SoMove connecting cable. • Check the time-out
SLF3	HMI communication	<ul style="list-style-type: none"> • Fault communicating with the external display terminal 	<ul style="list-style-type: none"> • Check the terminal connection
ULLF	Process underload fault	<ul style="list-style-type: none"> • Process underload • Motor current below the Application Underload threshold L U L parameter page 53 during a period set by Application underload time delay U L t parameter page 53 to protect the application. 	<ul style="list-style-type: none"> • Check the process and the parameters of the drive to be in phase
t JF	IGBT overheat	<ul style="list-style-type: none"> • Drive overheated • IGBT internal temperature is too high according to ambient temperature and load 	<ul style="list-style-type: none"> • Check the size of the load/motor/drive. • Reduce the Switching frequency S F r page 57. • Wait for the drive to cool before restarting

Diagnostics and Troubleshooting

Faults codes that will be reset as soon as their causes disappear

The USF fault can be inhibited and cleared remotely by means of a logic input ([Detected fault inhibition assignment](#) *I_{nH}* parameter page [81](#)).

Code	Name	Possible causes	Remedy
CF F	Incorrect configuration	<ul style="list-style-type: none">HMI block replaced by an HMI block configured on a drive with a different ratingThe current configuration of customer parameters is inconsistent	<ul style="list-style-type: none">Return to factory settings or retrieve the backup configuration, if it is valid.If the fault remains after reverting to the factory settings, contact your local Schneider Electric representative
CF I (1)	Invalid configuration	<ul style="list-style-type: none">Invalid configuration The configuration loaded in the drive via the bus or communication network is inconsistent. The configuration upload has been interrupted or is not fully finished.	<ul style="list-style-type: none">Check the configuration loaded previously.Load a compatible configuration
CF I2	Download invalid configuration	<ul style="list-style-type: none">Interruption of download operation with Loader or SoMove	<ul style="list-style-type: none">Check connection with Loader or SoMove.To reset the default re-start the download operation or restore the factory setting
US F	Undervoltage	<ul style="list-style-type: none">Line supply too lowTransient voltage dip	<ul style="list-style-type: none">Check the voltage and the parameters of Undervoltage Phase Loss Menu U56 - page 81.

(1) When the CFI is present in the past fault menu, it means the configuration has been interrupted or is not fully finished.

HMI block changed

When an HMI block is replaced by an HMI block configured on a drive with a different rating, the drive locks in Incorrect configuration **CF F** fault mode on power-up. If the card has been deliberately changed, the fault can be cleared by pressing the ENT key twice, which **restores all the factory settings**.

Diagnostics and Troubleshooting

Remote keypad error messages

Code	Name	Description
<i>In It:</i>	On initializing itself	<ul style="list-style-type: none">• Micro controller initializing• Communication configuration search
<i>C O N. E</i> (1)	Communication error	<ul style="list-style-type: none">• It has 50ms time out error.• This message is shown after 220 retry attempts.
<i>A - 17</i> (1)	Key alarm	<ul style="list-style-type: none">• Key has been pressed consecutively for more than 10 seconds.• Membrane switch disconnected.• Keypad woken up while a key is being pressed.
<i>c L r</i> (1)	Confirm Fault reset	<ul style="list-style-type: none">• This message appears if the STOP key is pressed when there is a keypad fault.
<i>d E U. E</i> (1)	Drive mismatch	<ul style="list-style-type: none">• Drive type (brand) did not match with keypad type (brand)
<i>r O N. E</i> (1)	ROM abnormality	<ul style="list-style-type: none">• Keypad ROM abnormality detected by the checksum calculation.
<i>r A N. E</i> (1)	RAM abnormality	<ul style="list-style-type: none">• Keypad RAM abnormality detected.
<i>C P U. E</i> (1)	The other defect	<ul style="list-style-type: none">• The other defect.

(1) Flashing

Collected Information for Serial Number :

KEYED HOLLOW SHAFT
RETAIN FOR FUTURE USE

1. Keyed hollow shaft design
NORD uses high quality hollow shafts. They are designed with a four point design to ensure the shafts are strong and long lasting.

2. Key and keys
NORD uses high quality keys. The keys are designed to fit the shafts perfectly. The keys are made of hardened steel and are designed to last for a long time.

3. Keyed hollow shaft bore tolerances
The bore tolerances of the shafts are very tight. This ensures that the shafts fit the gears perfectly.

NOBUBLOC® .1 FOOT MOUNTED OIL FILL QUANTITIES
RETAIN FOR FUTURE USE

NOBUBLOC® .1 foot mounted lubrication
The following table provides the oil fill quantities for the NOBUBLOC® .1 foot mounted lubrication system. The quantities are given in both US and metric units.

Part No.	Quantity
SK 021	2.00
SK 025	2.00
SK 031	4.00
SK 035	4.00
SK 041	4.00
SK 045	4.00
SK 051	4.00
SK 055	4.00
SK 061	4.00
SK 065	4.00
SK 071	4.00
SK 075	4.00
SK 081	4.00
SK 085	4.00
SK 091	4.00
SK 095	4.00
SK 101	4.00
SK 105	4.00

HELICAL IN-LINE PARTS LIST DRAWINGS
RETAIN FOR FUTURE USE

SK 11E - SK 51E Foot Mount

5. Gears	16. Spacers	25. Flange Eye Bolt
6. Pinions	17. Seal Plug	26. Washer
7. Oil Seal	18. Seal	27. Flange Ring
8. Key	19. Key	28. Washer
9. Oil Seal	20. Key	29. Washer
10. Oil Seal	21. Spacers	30. Washer
11. Output Ring	22. Air-Friction Bearing	31. Key
12. Input Flange	23. Seal	32. Flange Ring
	24. Seal	33. Flange Ring
	25. Flange Ring	

NORD Gear Limited
118 New York Ave., Ste. 200, St. Catharines, ON L2R 7G9

NORD Gear Corporation
118 New York Ave., Ste. 200, St. Catharines, ON L2R 7G9

Troubleshooting

This section identifies some of the most common issues involved with NORD Gear speed reducers, and provides recommendations to assist you in defining and answering your questions as you work with our products. You may also contact our Engineering/Application departments if your questions are not answered in the table below.

Problem With the Reducer		Possible Causes	Suggested Remedy
Runs Hot	Overloading	Load exceeds the capacity of the reducer	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce the load.
	Improper lubrication	Insufficient lubrication	Check lubricant level and adjust up to recommended levels
		Excessive lubrication	Check lubricant level and adjust down to recommended levels.
		Wrong lubrication	Flush out and refill with correct lubricant as recommended
Runs Noisy	Loose foundation bolts	Weak mounting structure	Inspect mounting of reducer. Tighten loose bolts and/or reinforce mounting and structure.
		Loose hold down bolts	Tighten bolts
	Failure of bearings	May be due to lack of lubricant	Replace bearing. Clean and flush reducer and fill with recommended lubricant.
		Overload	Check rated capacity of reducer.
	Insufficient lubricant	Level of lubricant in reducer not properly maintained.	Check lubricant level and adjust to factory recommended level.
Output shaft does not turn	Internal parts are broken or missing	Overloading of reducer can cause damage	Replace broken parts. Check rated capacity of reducer.
		Key missing or sheared off on input shaft.	Replace key.
		Coupling loose or disconnected	Properly align reducer and coupling. Tighten coupling.
Oil Leakage	Worn seals	Caused by dirt or grit entering seal.	Replace seals. Autovent may be clogged. Replace or clean.
	Unit runs hot or leaks	Overfilled reducer	Check lubricant level and adjust to recommended level.
		Vent clogged.	Clean or replace, being sure to prevent any dirt from falling into the reducer.
	Incorrect fill level	Improper mounting position, such as wall or ceiling mount of horizontal reducer.	Check mounting position on the name tag & verify with mounting chart in manual.

1. Safety & information symbols

All work including transportation, storage, installation, electrical connection, commissioning, servicing, maintenance and repair must be performed **only by qualified specialists or personnel**. It is recommended that repairs to NORD Products are carried out by the NORD Service Department. Instructions related to operational safety will be emphasized as shown.

Symbol	Meaning
	General Warning or Hazard - Severe risk or danger of personal injury or death by working around dangerously high electrical voltage or moving machinery. Proper safety precautions must be taken.
	Possible Harmful Situation - Care must be taken to avoid the possibility of damaging the drive unit, driven machine, or the environment.
	Important Note - Useful note or tip to help assure trouble-free operation.
	Material Disposal Note - Important note concerning suggested material disposal.

2. Safety warnings

GENERAL WARNINGS

- All work involved in the transport, connection, commissioning and maintenance of any NORD product must be carried out by qualified and responsible technicians. All applicable national, regional, and local work regulations and safety requirements must also be complied with. **NORD assumes no liability for personal injury, accidental death, or equipment damage and malfunctions resulting from failure to comply with installation or operating instructions, safety notes, or any work regulations and laws!**
- Gear unit installation and maintenance work may only be performed when no power is available to the prime mover or motor. Electric motors, electrical brakes, and variable frequency drives, contain potentially dangerous high-voltage. Prior to installation or maintenance, shut down the power at the circuit breaker or power switch. **While working on the drive, make sure the power from the prime mover is isolated or secured on "lock-out" to prevent accidental start-up and to safeguard against injury!**
- Surfaces of motors and gear units may become hot during operation or shortly after start-up. In some instances additional protection against accidental contact may be necessary. **Use caution to avoid burns or serious injury!**

3. Observe published performance range & nameplate data

HARMFUL SITUATION

Observe the data on all reducer nameplates and verify published ratings for the NORD item/s in question. Do not operate any NORD equipment outside the published performance range. Failure to comply may result in damage to the drive unit, driven machine, or the environment.

U.S. Nameplate

NORD GEAR CORPORATION-USA / WWW.NORD.COM

SK ①	
S/N ②	
RATIO ③	SF ④
TORQUE ⑤	LB-IN
SPEED ⑥	RPM
⑦ MTG POS	

FOR GEAR LUBRICATION SEE MANUAL

- ① Model/Type
- ② Serial Number
- ③ Gear Ratio
- ④ Service Factor
- ⑤ Torque Rating
- ⑥ Output Speed RPM
- ⑦ Mounting Position

European Nameplate

Getriebebau NORD
 GrbH&Co KG
 D - 22934 Bargteheide

Type SK ①	
No. ②	
i= ③	
n2= ④	min ⁻¹

Siehe Wartungsanleitung
 See maintenance instructions
 Voir instructions d'entretien

- ① Model/Type
- ② Serial Number
- ③ Gear Ratio
- ④ Speed

4. Transportation and handling

Make sure that all eyebolts and lifting lugs are tight and lift only at designed points. Protect the mounting surface from possible damage during transportation.



WARNING

Do not attach other machinery or loads to the NORD assembly, since the supplied lifting bolts are not designed for this purpose.

If the gearmotor or assembly is equipped with two suspension eye bolts, then both locations should be used for transportation and placement of the unit; in this case the tension force of the slings must not exceed a 45° angle.

In some instances it may be appropriate to use additional lifting straps or slings in order to assure safe transportation of the assembly. Always use sufficiently rated handling equipment and ensure that adequate safety measures are taken to protect personnel from injury during transportation. Once the NORD assembly is properly installed, remove the transportation fixtures.

7. DISPOSAL

	MATERIAL DISPOSAL	
<p>Properly dispose of all used gear units and internal parts in accordance with all local regulations. In particular, all lubricants must be properly collected and disposed.</p>		

For confirmation of specific materials used in a specific reducer or gearmotor assembly, please consult NORD with the appropriate unit identification or serial number.

Components	Material
Gear wheels, shafts, rolling bearings, parallel keys, snap rings, spacers, shims, etc.	Steel
Gear housing and housing components	Cast iron or Aluminum (depending on type and size)
Worm gears	Bronze alloy
Radial seals, sealing caps, and rubber components	Elastomers with some steel
Coupling components	Plastic or Elastomer with Steel
Housing gaskets and flat oil seals	Asbestos-free sealing or gasket material (various types used)
Gear Oil	Mineral, SHC-Synthetic or PG-Synthetic (can vary)

1. Storage



IMPORTANT NOTE



For storage periods longer than 9 months, or for storage in less than desirable conditions, please consult NORD for recommendations.

Storage for up to 9 months is possible, so long as the following conditions are observed:

- Store the gear unit in its actual mounting position in accordance with the specified oil fill-level, in a clean and dry temperature controlled area. Avoid temperature fluctuations within the range of 0°C and 40°C (32°F to 104°F) and avoid relative humidity conditions in excess of 60%.
- Protect all exposed or unpainted shaft and flange surfaces with an anti-corrosion agent or grease.
- Store in a location free from shock and vibration, to avoid false brinelling of bearing elements and raceways.
- Whenever possible, rotate the shafts periodically, by hand if necessary, to help prevent brinelling (bearing damage) and to help keep the shaft seals pliable.
- Avoid direct exposure to the sun or UV light and aggressive or corrosive materials in the environment (ozone, gases, solvents, acids, caustic solutions, salts, radioactivity, etc).

2. Commissioning

Prior to gear unit start-up, complete the following:

- Check the lubricant and be sure the gear unit is filled with the proper oil type, to the proper level, as determined by the mounting position.



IMPORTANT NOTE



Some smaller gear units are supplied as maintenance free/lubricated for life gear units. Oil level may not be checked on some of these units.

- Check the condition of all shaft seals and all assembled flange gasket areas. If any change is detected in the shape, color, hardness or permeability, or if any leaks are detected, the corresponding shaft seals and/or gaskets must be replaced.
- Remove all anti-corrosive metal protectant from otherwise bare metal surfaces. Follow product manufacturers directions and warnings during surface protection removal.
- Check the resistance of all motor and brake windings to verify the integrity of the winding insulation and inspect all terminal box openings and wire connection areas to verify that all components are dry and free of corrosion.

3. Long-Term Storage

By taking special precautions, problems such as seal leakage and reducer failure due to the lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

- Store the gear unit in its actual mounting position in accordance with the specified oil fill-level, in a clean and dry temperature controlled area. Avoid temperature fluctuations within the range of 0°C and 40°C (32°F to 104°F) and avoid relative humidity conditions in excess of 60%.
- Fill the reducer full with oil that is compatible with the product normally used or recommended during service.
- Apply grease to all unpainted or unprotected shafts, bores, keyways, flange surfaces, tapped holes, and to the exterior of all oil seals.
- Store in a location free from shock and vibration, to avoid false brinelling of bearing elements and raceways.
- Once every few months rotate the input shaft approximately 10-20 revolutions to redistribute the weight of gears and shafts and to prevent brinelling of the bearings and drying of the seal track.
- Avoid direct exposure to the sun or UV light and aggressive or corrosive materials in the environment (ozone, gases, solvents, acids, caustic solutions, salts, radioactivity, etc.)

4. Commissioning After Long-Term Storage

- Remove all anti-corrosive metal protectant from otherwise bare metal surfaces. Follow product manufacturers directions and warnings during surface protection removal.
- Drain the reducer and refill it with the proper type and amount of lubricant.
- Observe start-up and initial operation to make sure there are no seal or gasket leaks, or unusual sounds, vibration or heat rise during operation.
- Check the resistance of all motor and brake windings to verify the integrity of the winding insulation and inspect all terminal box openings and wire connection areas to verify that all components are dry and free of corrosion.



1. Installation site

Drives must be properly installed if they are to produce the rated torque. Improper installation may lead to oil leaks, reduced life, or even catastrophic failure. NORD gear drives and motors are intended to be installed at a suitable mounting site under the following conditions:

- Unimpeded airflow to and around the units.
- Accessibility to oil drain, level and breather plugs.
- On brakemotors, allow adequate space for removing the fan guard and replacing and adjusting the brake.
- Mounting surfaces must be flat, torsionally rigid, and dampened against vibration.
- Unless special measures are taken, the immediate vicinity around the gear drive or motor should not be exposed to any aggressive or corrosive substances, contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity, etc.

2. Mounting position

Reducer mounting position charts illustrate the standard mounting positions for horizontal and vertical mounting. All gear units are assembled with the oil fill-level, oil-drain and vent plugs installed in their proper locations, **according to the customer-specified mounting position**. For mounting orientations other than shown consult NORD Gear.

	HARMFUL SITUATION	
<p>The gear reducer may not receive proper lubrication if the unit is not mounted in the position for which it is designed. Observe the mounting position designated on the reducer nameplate, or specified in the order acknowledgement. Consult NORD prior to changing mounting position in the field. While it is often possible to simply relocate the oil fill-level and vent locations, and adjust the oil fill amount, in some cases, different mounting positions may lend themselves to different internal construction features.</p>		

3. Reducer mounting

- The support foundation must be straight, level and flat. Whether the gear unit is foot-mounted or flange-mounted, NORD recommends that the straightness and flatness of the customer-supplied support foundation follow **Table 1**.
- The gear unit must be properly aligned with the driven shaft of the machine in order to prevent additional stress or load forces from being imposed upon the gear unit.
- To facilitate oil drainage it may be desirable to elevate the gear box foundation above the surrounding support structure.
- All bolting surfaces must be clean and free from contamination and corrosion.



Table 1: Recommended Straightness and Flatness of Customer-Supplied Support Foundation

Above (in)	To & Including (in)	General Tolerance on Straightness & Flatness ISO 2768-2, Tolerance Class K
0.00	0.39	+/- 0.002 in
0.39	1.18	+/- 0.004 in
1.18	3.9	+/- 0.008 in
3.9	11.8	+/- 0.016 in
11.8	39	+/- 0.024 in
39	118	+/- 0.031 in

Above (mm)	To & Including (mm)	General Tolerance on Straightness & Flatness ISO 2768-2, Tolerance Class K
0	10	+/- 0.05 mm
10	30	+/- 0.1 mm
30	100	+/- 0.2 mm
100	300	+/- 0.4 mm
300	1000	+/- 0.6 mm
1000	3000	+/- 0.8 mm



Straightness: Based upon the length of the corresponding line.

Flatness: Based upon the longer lateral surface or the diameter of the circular surface.

	HARMFUL SITUATION	
<p>The responsibility for the design and construction of the support foundation is with the user. The foundation must be adequate to withstand normal operating loads and possible overloads while maintaining alignment to attached system components under such loads. Motors and drive components mounted on prefabricated base plates can become misaligned during shipment. Always check alignment after installation.</p>		

4. Steel foundation

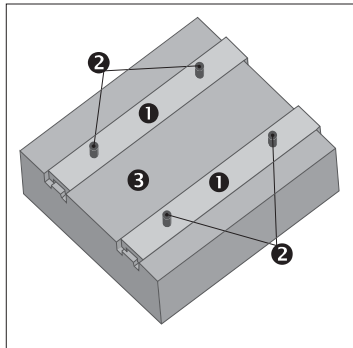
An engineered structural steel foundation should be designed to provide adequate rigidity and prevent loads from distorting the housing or causing misalignment of internal gears and shafts. When foot-mounting the gear reducer, a base plate or sole plate with suitable thickness (generally equal or greater than the thickness of the drive feet) should be securely bolted to steel supports and extend under the entire gear drive assembly. When flange-mounting the gear unit, the bulk head plate must be engineered to minimize buckling distortions and support the cantilevered weight of the gear unit or gear motor.

	HARMFUL SITUATION	
<p>Do not weld on the gear unit or use the gear unit as an earth or ground connection for any welding procedure as this may cause permanent damage to the bearings and gears.</p>		

5. Concrete foundation

If a concrete foundation is used, allow the concrete to set firmly before bolting down the gear drive. Grout structural steel mounting pads and bolts of sufficient size into the concrete, to adequately distribute the load stress onto the concrete foundation.

Figure 1: Concrete Foundation



- ❶ Grouted Structural Steel Mounting Pads
- ❷ Mounting Bolts
- ❸ Concrete Foundation

6. Bolt connections for footed & flange mounted units

NORD footed reducers and flange-mount reducers (with B5 flange) have clearance designed into the mounting holes to allow for some minor adjustments in alignment. Bolt size, strength and quantity should be verified to insure proper torque reaction capacity whatever the mounting arrangement. Tightening torque for gear reducer mounting bolts, and recommended fastener grades, are provided in Table 2.

Table 2A: Tightening Torque for Inch Reducer Mounting Bolts

Thread Size (in)	Grade SAE 5 / ASTM A449		Grade SAE 8	
	(lb-ft)	(Nm)	(lb-ft)	(Nm)
1/4-20	7.1	9.6	10.0	13.6
5/16-18	16	21	22	30
3/8-16	28	37	39	53
1/2-13	69	93	98	132
5/8-11	138	188	195	264
3/4-10	247	334	348	472
7/8-9	396	537	558	757
1-8	592	802	833	1,130
1 1/8-7	-	-	1,233	1,672
1 1/4-7	-	-	1,717	2,327
1 3/8-6	-	-	2,267	3,073
1 1/2-6	-	-	2,983	4,045
1 3/4-5	-	-	4,458	6,045

- Calculated tightening torques are based a conventional 60°, clean and dry (un-lubricated) thread, with thread-friction and head-friction equal to 0.15.
- When using inch-fasteners, NORD recommends a minimum Grade SAE 5 (ASTM A-449) for sizes up to 1-8 UNC, and Grade SAE 8 for all larger sizes.

Table 2B: Tightening Torque for Metric Reducer Mounting Bolts

Above (mm)	ISO Grade 8.8		ISO Grade 10.9		ISO Grade 12.9	
	(lb-ft)	(Nm)	(lb-ft)	(Nm)	(lb-ft)	(Nm)
M4	2.4	3.2	3.5	4.7	4.1	5.5
M5	4.7	6.4	6.9	9.3	8.1	11
M6	8	11	12	16	14	19
M8	20	27	29	39	34	46
M10	39	53	58	78	67	91
M12	68	92	100	135	110	155
M14	107	145	159	215	180	250
M16	170	230	247	335	290	390
M18	240	325	343	465	400	540
M20	339	460	487	660	570	770
M22	465	630	664	900	770	1,050
M24	583	790	848	1,150	960	1,300
M27	848	1,150	1,217	1,650	1,440	1,950
M30	1,180	1,600	1,660	2,250	1,950	2,650
M36	2,050	2,780	2,884	3,910	3,470	4,710
M42	3,297	4,470	4,639	6,290	5,560	7,540
M48	4,940	6,700	7,010	9,500	8,260	11,200

- Calculated tightening torques are based on a conventional 60°, clean and dry (un-lubricated) thread, with thread-friction and head-friction equal to 0.15.
- When using metric-fasteners, NORD recommends a minimum ISO Grade 8.8 bolt.

7. Mounting the prime mover

When the motor is not flange mounted or integrally mounted to the gearbox, it is important to properly secure and align the gear drive with respect to the driven machine before attempting to align the prime mover or motor.

- After the main gear drive is properly aligned and bolted in place, align the prime mover with respect to the reducer input shaft.
- Use shims under the feet of the prime mover as needed, and secure in place with the proper mounting bolts. Dowel pins may be field-installed to help prevent misalignment and ensure proper realignment if removed for service.

i **IMPORTANT NOTE** i

When using a high speed coupling connection between the prime mover and the reducer, check alignment per the coupling manufacturers recommendations. If the coupling is misaligned, the reducer alignment or shimming is incorrect. Re-align the gear reducer and re-check the high-speed coupling alignment before re-aligning the motor.



FLEXBLOC™ VENT LOCATIONS



Vent locations

NORD can provide a vent kit option for all FLEXBLOC™ gear units.

Open Vent Kit	P/N 22008004 (Vent) P/N 25308121 (Gasket)
AUTOVENT™	P/N 22008050 (Includes Gasket)

STOP

HARMFUL SITUATION

STOP

The FLEXBLOC™ worm gear unit is intended to be mounted in one of six positions as shown. For mounting positions other than shown, please consult NORD Gear prior to commissioning the gear drive unit.

⚠

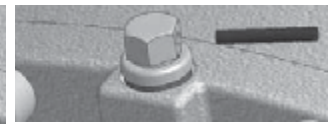
WARNING

⚠

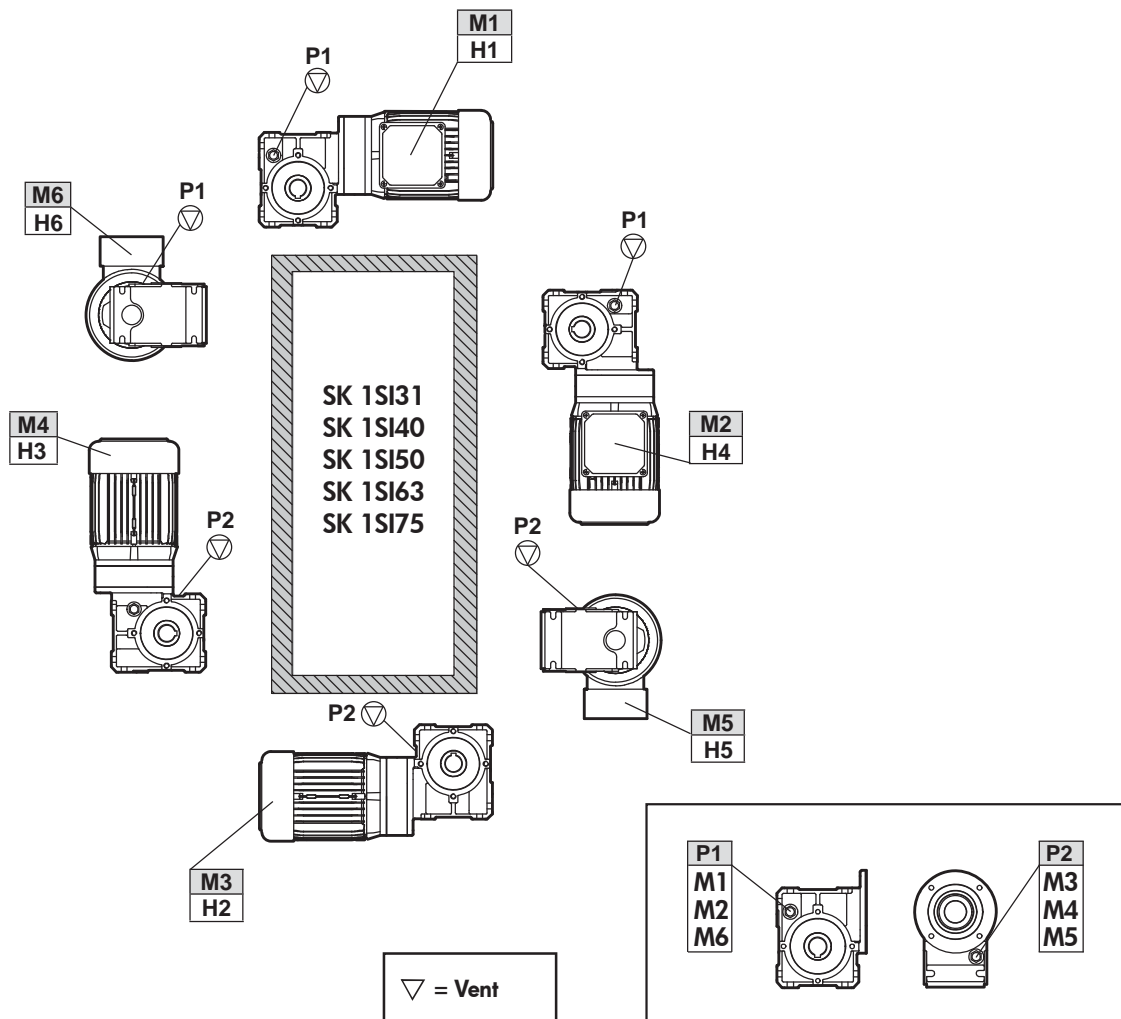
To prevent build-up of excessive pressure, sealed vents must be activated as shown prior to gear unit start up.



Sealed vent



Activated vent

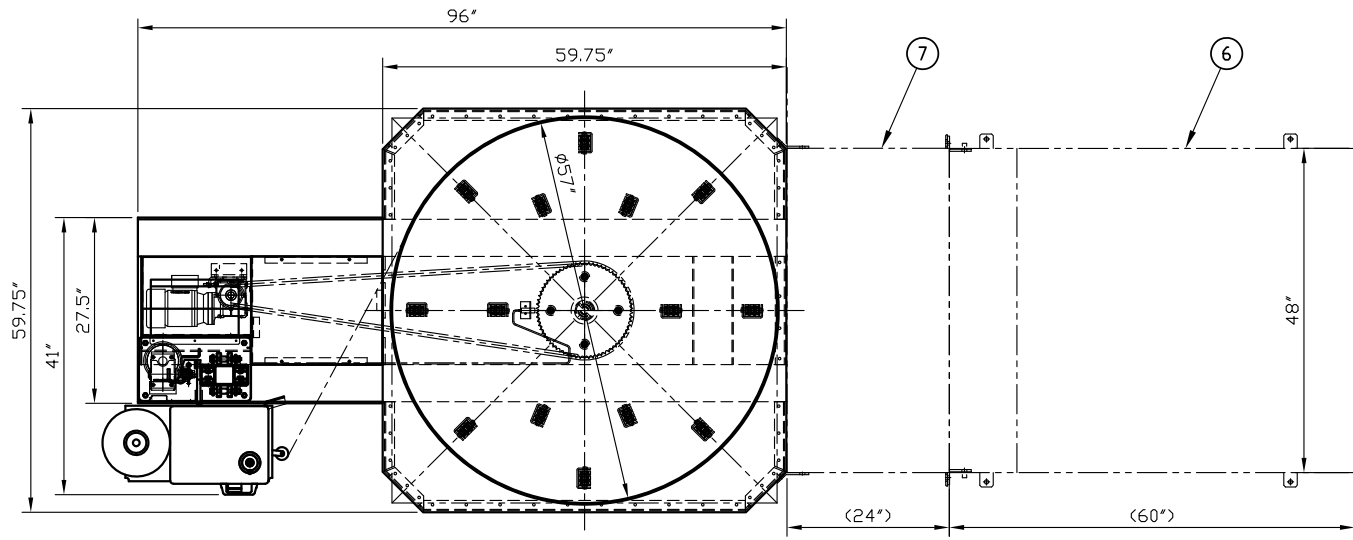


13:0

**M
E
C
H
A
N
I
C
A
L

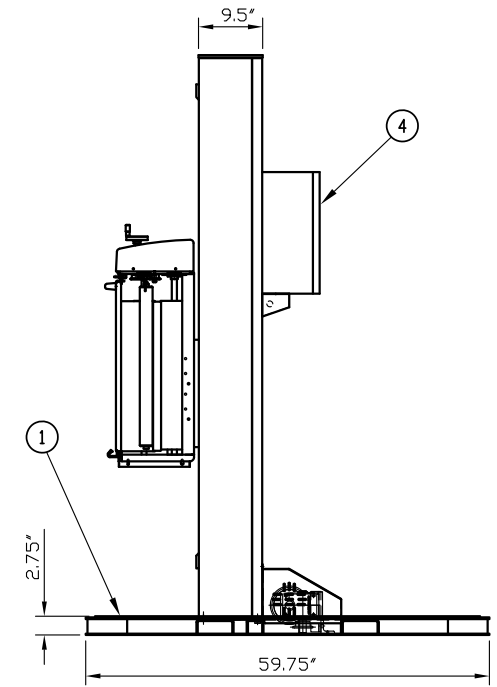
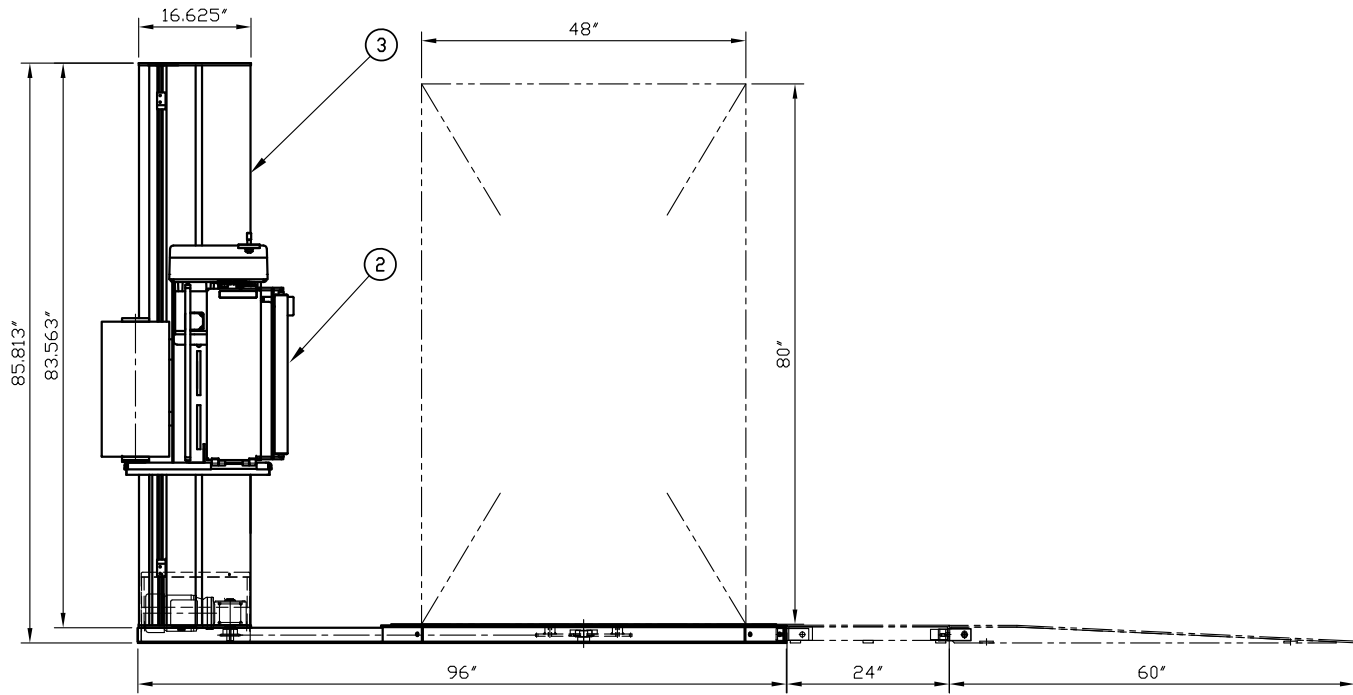
D
R
A
W
I
N
G
S**

SER.
No.



MATERIAL LIST			
ITEM	QTY.	DESCRIPTION	PART No.
1	1	BASE ASSEMBLY c/w 57" DIA. TURNTABLE	G2300-093-00-R5
1A	(1)	#5,000 RATED BASE ASSEMBLY c/w 57" DIA. TURNTABLE	G2300-107-00-R4
2	1	RAPID THREAD PRESTRETCH CARRIAGE ASSEMBLY	G2900-117-00-R6
3	1	STD. TOWER ASSEMBLY 80' LOAD HEIGHT	G2700-052-00-R4
4	1	CONTROL PANEL	E2100-188-ROA
5	.	.	.
6	(1)	OPTIONAL - RAMP WELDMENT 48" WIDE x 60" LONG	C3156
6A	(1)	OPTIONAL - 10,000# RAMP WELDMENT 48" WIDE x 60" LONG	C3246
7A	(1)	OPTIONAL - PORCH EXTENSION 48" WIDE x 24" LONG	C3279
7B	(1)	OPTIONAL - PORCH EXTENSION 48" WIDE x 40" LONG	C3415
7C	(1)	OPTIONAL - 10,000# PORCH EXTENSION 48" WIDE x 24" LONG	C3448

NOTE: OPTIONAL RAMP CAN BE INSTALLED ON FRONT OR SIDES OF MACHINE.



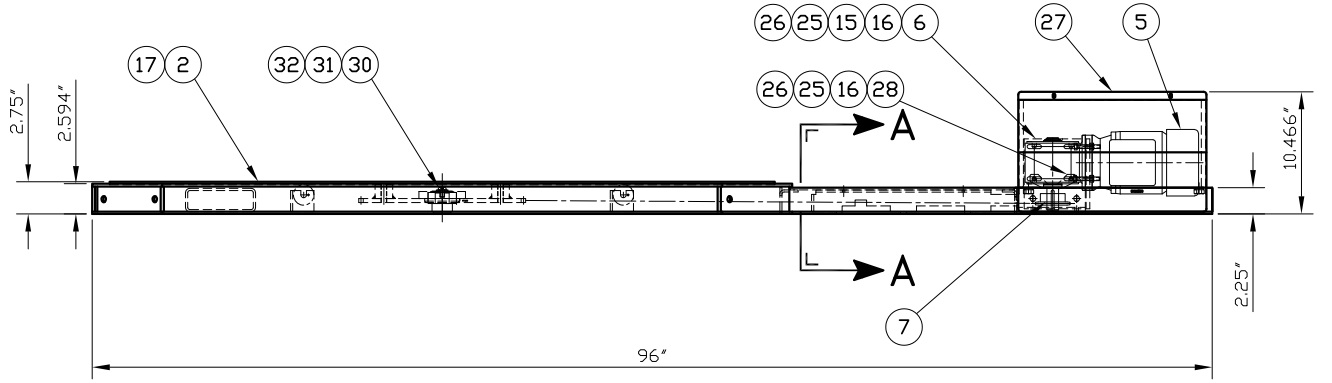
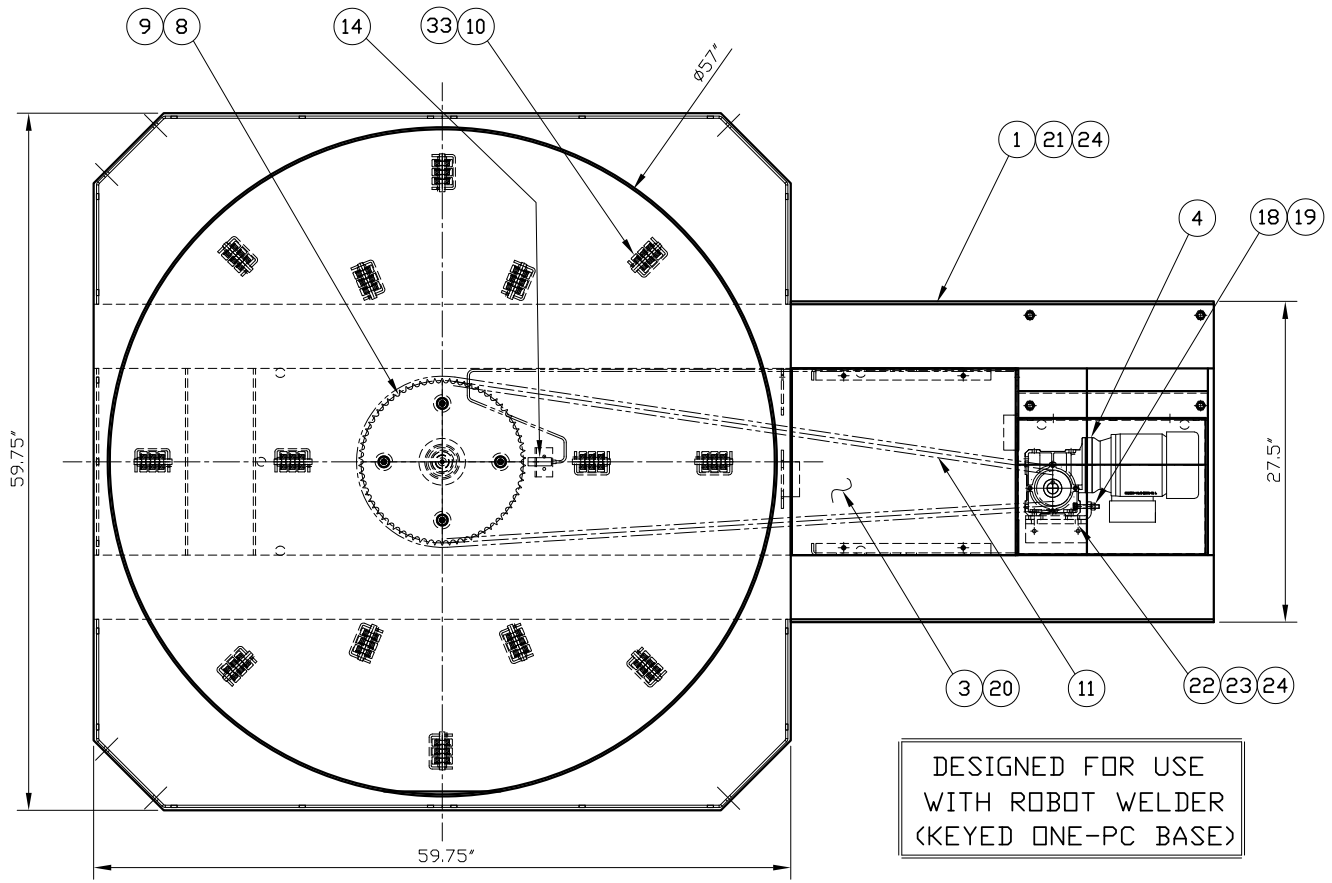
No.	DESCRIPTION	DATE
13	ITEM 1 R5 WAS R4.	2021-06-25
12	IT.1 R4 WAS R3. IT.2 R6 WAS R5	2019-10-25
11	IT.1 WAS G2300-093-00-R3	2019-03-22
10	ITEM 2 WAS R4	2018-12-27

COUSINS PACKAGING INC.

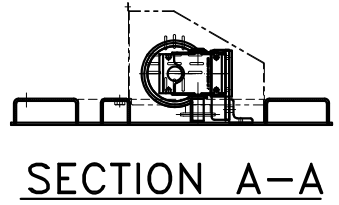
SCALE 1 : 14	TITLE LP2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE c/w 57" DIA. TURNTABLE & STD. TOWER
DATE NOV. 22, 2011	DRAWING NO. G2100-208-00
DRAWN BY SD	CHECKED BY RMP
SHEET 1 OF 1	REVISION 13

TREATMENT:
PAINT

PART
No. *

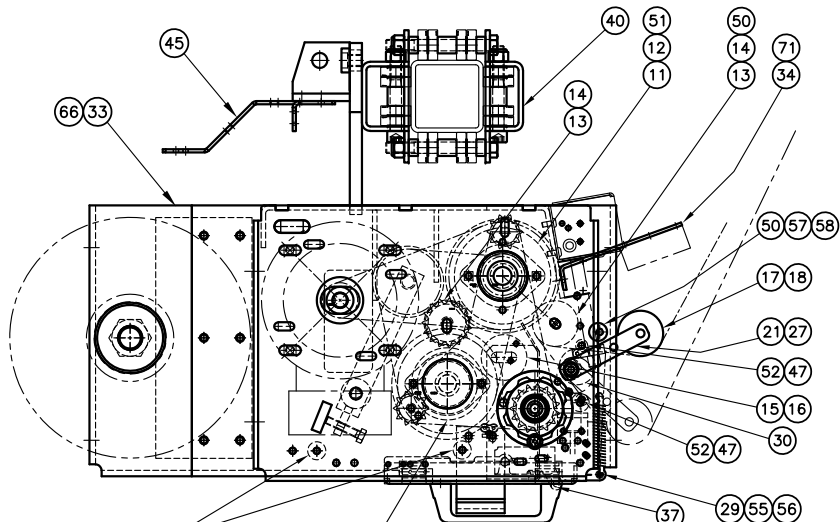


MATERIAL LIST				PART No. *
ITEM	QTY.	DESCRIPTION		PART No.
1	1	BASE WELDMENT		G2300-093-01-00-R8
2	1	57" DIA. TURNABLE (1/4" THK.)		C3314
2A	(1)	57" DIA. TURNABLE (HRS DIAMOND TREAD PLATE 1/4" THK.)		C5287
3	1	TURNABLE BASE DECK PLATE		F3598
4	1	NORD FLEXBLDC GEAR-REDUCER, SK1S150, 20:1 RATIO		A506
5	1	NORD EL. MOTOR 1/2 HP 230/460 V AC		A461
5A	(1)	NORD EL. MOTOR 3/4 HP 230/460 V AC		A477
6	1	NORD RIGHT ANGLE MOTOR-GEAR MOUNTING BRACKET		F2230
7	1	SPROCKET 50B12, 1" BORE, K2SS		K180
7A	(1)	SPROCKET 50B12, 25MM BORE, K2SS		K509
8	1	50A70 BOLT-ON TURNABLE CENTER SPROCKET WELDMENT		K510
9	1	BALL BEARING, DOUBLE ROW 30/62/24		B126-2
10	14	TURNABLE SUPPORT ROLLER ASSEMBLY		S236-W
11	1	CHAIN ANSI #50 - 207 PITCHES LONG + CONNECTING LINK		K625
12	.	.		.
13	.	.		.
14	1	PROXIMITY SENSOR, 18MM DIA.		E2166
15	4	HEX CAP SCREW M8 - 30MM LG. (NOT SHOWN)		H1381
16	6	HEX NUT M8x1.25		H1214
17	4	FLAT HEAD SOCKET SCREW M12 - 25MM LG.		H1387
18	2	HEX CAP SCREW M8 x 50MM LG. FULLY THREADED		H1468
19	2	NYLON INSERT LOCK NUT M8x1.25 (NOT SHOWN)		H1469
20	6	BUTTON HEAD SCREW M6x1 - 12MM LG. (NOT SHOWN)		H1388
21	4	HEX CAP SCREW M12x1.75 - 30MM LG. (NOT SHOWN)		H1379
22	2	HEX CAP SCREW M12x1.75 - 35MM LG. (NOT SHOWN)		H1408
23	2	HEX NUT M12x1.75 PLATED (NOT SHOWN)		H765
24	6	LOCK WASHER FOR BOLT SIZE M12 (NOT SHOWN)		H1402
25	4	LOCK WASHER FOR BOLT SIZE M8 (NOT SHOWN)		H776
26	8	FLAT WASHER FOR BOLT SIZE M8 (NOT SHOWN)		H775
27	1	MOTOR-GEAR GUARD		F2231
28	1	NUT BAR		F2290
29	(1)	DRIVE GUARD SUPPORT PLATE FOR TT UNIT ONLY (NOT SHOWN)		F2564
30	1	BUTTON HEAD SCREW M10x1.5 x 16MM LG.		H1540
31	1	FLAT WASHER 1.75" O.D. x .688" I.D. x .13" THK		H773
32	1	FLAT WASHER 3/8" DIA. NOMINAL, PLATED		H771
33	14	SPRING PIN 1/8" DIA. x 9/16" LONG		H1094



FOR RIGHT ANGLE GEAR-MOTOR
NORD-SK1S150-VA/I-IEC71

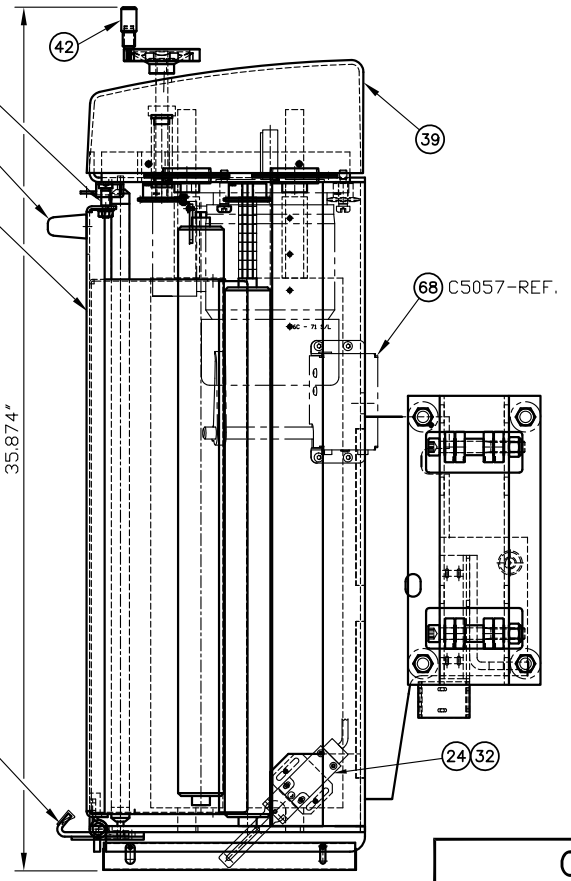
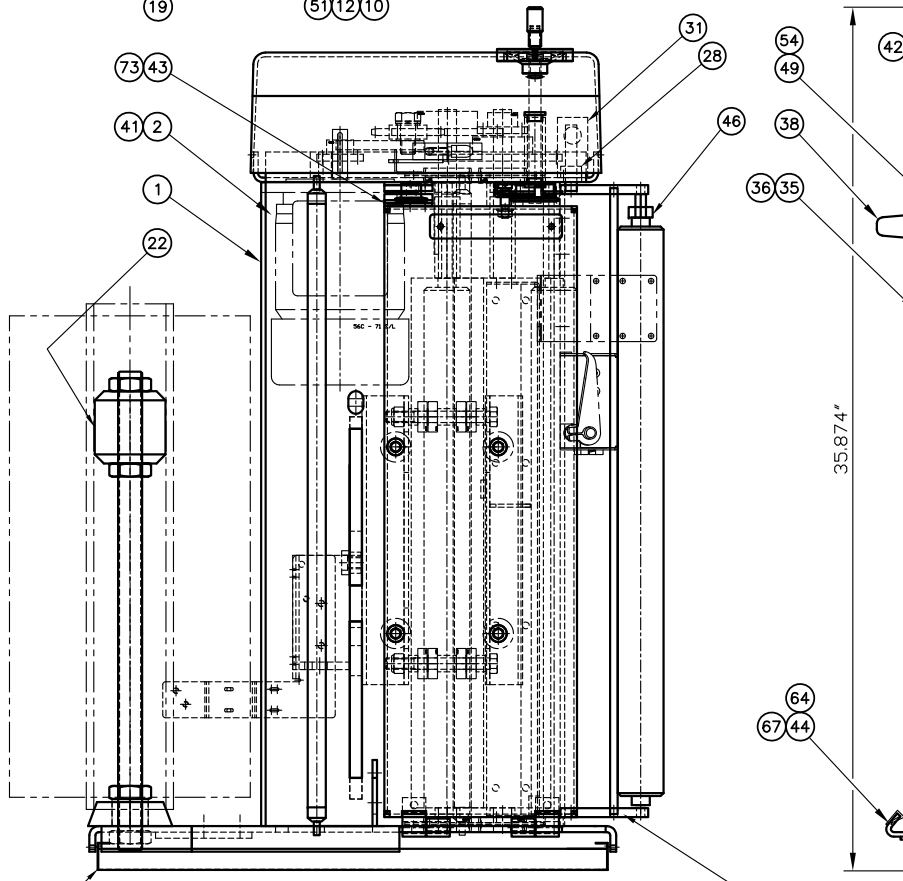
5	IT. 1 WAS R6	2020-11-12	SCALE 1 : 8	COUSINS PACKAGING INC.		
4B	K625 WAS K120-11, REMOVE IT.12	2020-03-20		TITLE ROBOT WELD - LP2100 SRT STRETCH WRAP MACHINE		
4A	ADD C5287 OPTIONAL TT TOP	2019-07-03		BASE ASSEMBLY, c/w 57" TURNABLE AND DRIVE		
4	REDESIGNED FOR ROBOT WELD	2019-05-29		DATE MAY, 16, 2018	DRAWING NO. G2300-093-00	SHEET 1 OF 1
No.	DESCRIPTION	DATE	DRAWN BY JL	CHECKED BY SD		
REVISIONS						



MATERIAL LIST (ELECTRICAL - NOT SHOWN)

ITEM	QTY.	DESCRIPTION	PART No.
70	2	LIMIT SWITCH SIDE-ROTARY c/w 30mm RADIUS ARM	E1873
71	1	PHOTO-EYE ADJ. Q2 TO 25M. RANGE REFLECTIVE 24-240VAC/24-240VDC	E1661
72	1	INDUCTIVE PROXIMITY SENSOR c/w ANALOGUE OUTPUT	E488
73	1	CODED MAGNETIC SWITCH, 2-POLE	E2184

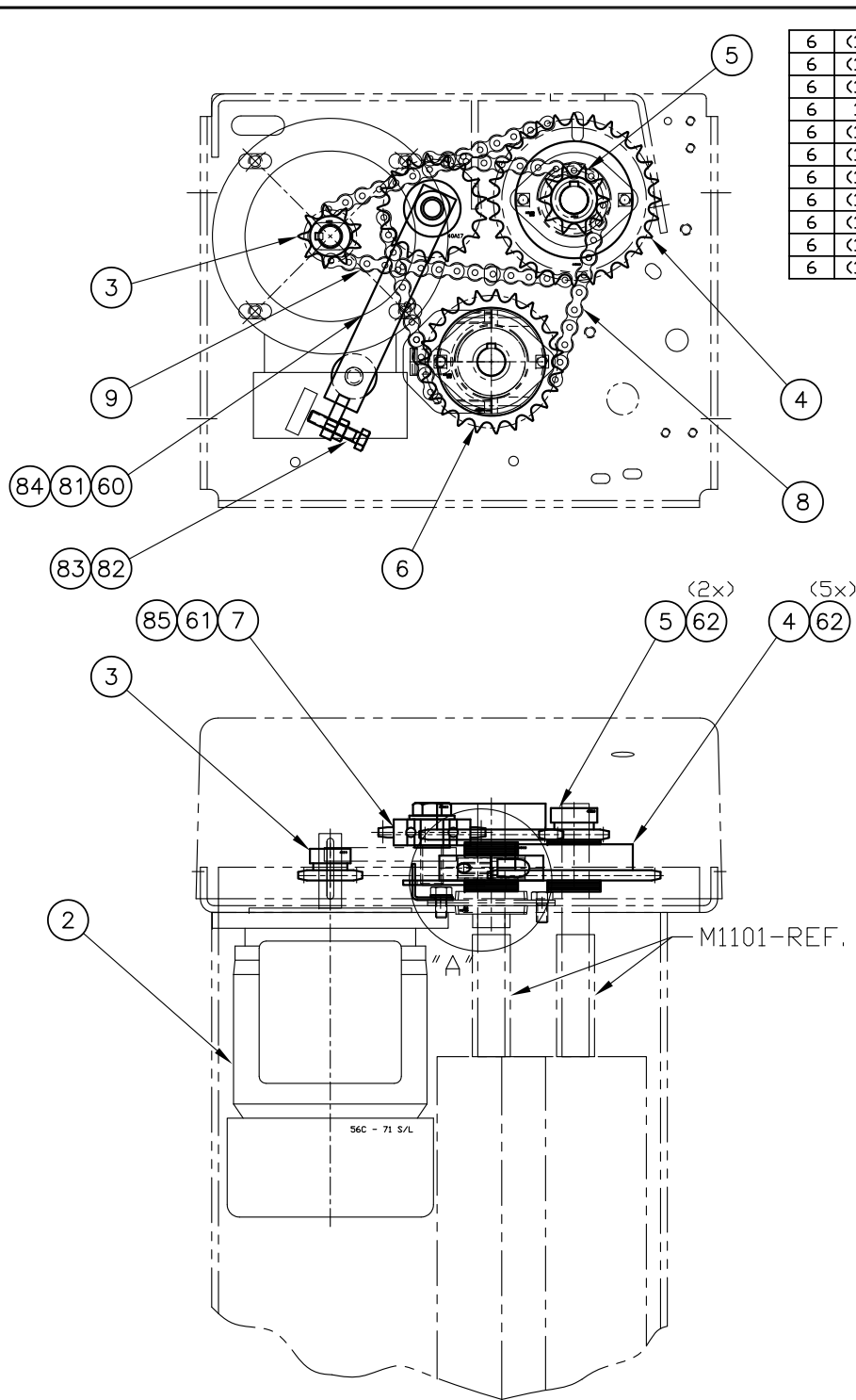
NOTES:
 -SEE SHEET 2 FOR DRIVE ASSEMBLY
 -SEE DRAWING C3556-R2 FOR FILM THREADING ASSEMBLY
 -OPTIONAL ITEMS 21B AND 68 REQ'D FOR AUTOFILM CUT
 -REFERENCE C5057 FOR AUTO FILM CUT INSTALL



ITEM	QTY.	DESCRIPTION	PART No.
1	1	CARRIAGE FRAME WELDMENT	G2900-117-01-00-R8
10	1	PRESTRETCH ROLLER #3"x 22" LG POLYURETHANE c/w 20MM SHAFT	W322
11	1	PRESTRETCH ROLLER #4"x 22" LG POLYURETHANE c/w 20MM SHAFT	W323
12	4	BEARING 2-BOLT 20MM BORE c/w PRESSEED STEEL HOUSING	B301
13	2	ROLLER ALUMINUM #1.9" x 22.75" LONG c/w 7/16" HEX BORE	W223
14	2	SHAFT 7/16" HEX x 26.69" LONG c/w M8-125 TAPPED ENDS	W329
15	1	ROLLER ALUMINUM #1.9" x 22.00" LONG c/w 7/16" HEX BORE	W325
16	1	SHAFT 7/16" HEX x 22.26" LONG c/w M8-125 TAPPED ENDS	W326
17	1	ROLLER ALUMINUM #1.9" x 24.44" LONG c/w 7/16" HEX BORE	W324
18	1	SHAFT 7/16" HEX x 25.50" LONG c/w M8-125 TAPPED ENDS	W412
19	2	ROLLER ALUM. #3/4" x 26.50" LG. c/w 1/4" SPRING LOADED SHAFT	W330
20	.	.	.
21A	1	DANCER ROLLER FRAME WELDMENT	C3742
21B	(1)	DANCER ROLLER FRAME WELDMENT, AUTO FILM CUT	C5060
22	1	MANDREL ASSEMBLY	G170-007-00-R3
23	1	SAFETY TRAY	F1968-R4
24	1	SAFETY LIMIT SWITCH	E1663
25	4	BUTTON HEAD SCREW M5 x 20MM LONG	H1394
26	1	BRONZE FLANGE BUSHING 10MM ID x 13MM OD x 10MM LG.	B297
27	1	BRONZE FLANGE BUSHING 12MM ID x 16MM OD x 8MM LG.	B299
28	1	SHAFT COLLAR STEEL 12MM ID c/w SS	Q183
29	1	EXTENSION SPRING	V166
30	1	DANCER BAR PROXIMITY SENSOR TARGET CAM	M1074
31	1	DANCER BAR PROXIMITY SENSOR MOUNTING BRACKET	F57-R1
32	1	SAFETY LIMIT SWITCH MOUNTING PLATE	M1073
33	1	BOTTOM PLATE EXTENSION WELDMENT	C3379
34	1	PHOTO-EYE MOUNTING PLATE	F2205-R2
35	1	CARRIAGE DOOR	C3193-R3
36	2	CARRIAGE DOOR HINGE PIN	C3234
37	1	ROTARY SLAM LATCH - RIGHT HAND	X102
38	1	PLASTIC CABINET U-HANDLE	X103
39	1	CARRIAGE COVER - PLASTIC	F1935-R4
39	(1)	CARRIAGE COVER - SHEET METAL	F5414
40	1	CARRIAGE CARRIER PLATES ASSEMBLY	C4109
41	1	SPACER WASHER FOR ITEM 2	F13-R1
42	1	FILM THREADING SUBASSEMBLY	C3556-R2
43	3	SHIM PLATE FOR MAGNETIC SAFETY SWITCH	F2101
44	1	CARRIAGE DOOR STOPPER	F2102-R1
45	1	CABLE TRACK BRACKET	F4139
46	1	SHAFT COLLAR 1/2" BORE	Q114
47	4	NYLON SPACER 0.5"OD x 0.317ID x 0.337" LG.	H1353
48	1	SHOULDER BOLT 10MM DIA. x 20MM LG. M8-125	H1373
49	1	SHOULDER BOLT 3/8" DIA. x 5/8" LG.	H842
50	20	NYLON SPACER, 1/2" ID x 3/4" OD x 3/8" LG.	H1011
51	2	PVC PIPE SPACER FOR PRESTRETCH ROLLERS - 3.375"LG	M1101
52	2	HEX. CAP SCREW #8MM x 30MM LONG,	H1381
53	1	NYLON SPACER	H1330
54	1	TDP LOCK FLANGE NUT 5-16"-18	H922
55	1	SHOULDER BOLT 6MM DIA. x 30MM LG. (M5)	H1491
56	1	SHOULDER BOLT 6MM DIA. x 16MM LG. (M5)	H1496
57	2	FLAT HEAD SCREW M8 X 35MM LONG	H1455
58	3	HEX NUT M8	H1214
64	1	CLIP-ON WEAR STRIP 3/4" WIDE x 2' LONG	RC598-2
66	6	BUTTON HEAD SOCKET SCREW M6 x 12MM LONG	H1388
67	1	SUPPORT PLATE FOR CARRIAGE DOOR STOPPER	F3109
68	(1)	(OPTIONAL) AUTO FILM CUT MECHANISM	C5057

COUSINS PACKAGING INC.

6A	SEE SHEET 2	2022-08-05	SCALE 1 : 4	TITLE	SRT SERIES, STRETCH WRAP MACHINES
6	ITEM 1 R8 WAS R6	SEPT.17/19	DATE	AUGUST 28, 2013	CARRIAGE ASSEMBLY
No.	DESCRIPTION	DATE	DRAWN BY	CHECKED BY	DRAWING No.
	REVISIONS		SD	RMP	G2900-117-00
					SHEET 1 of 2
					REVISION 6A



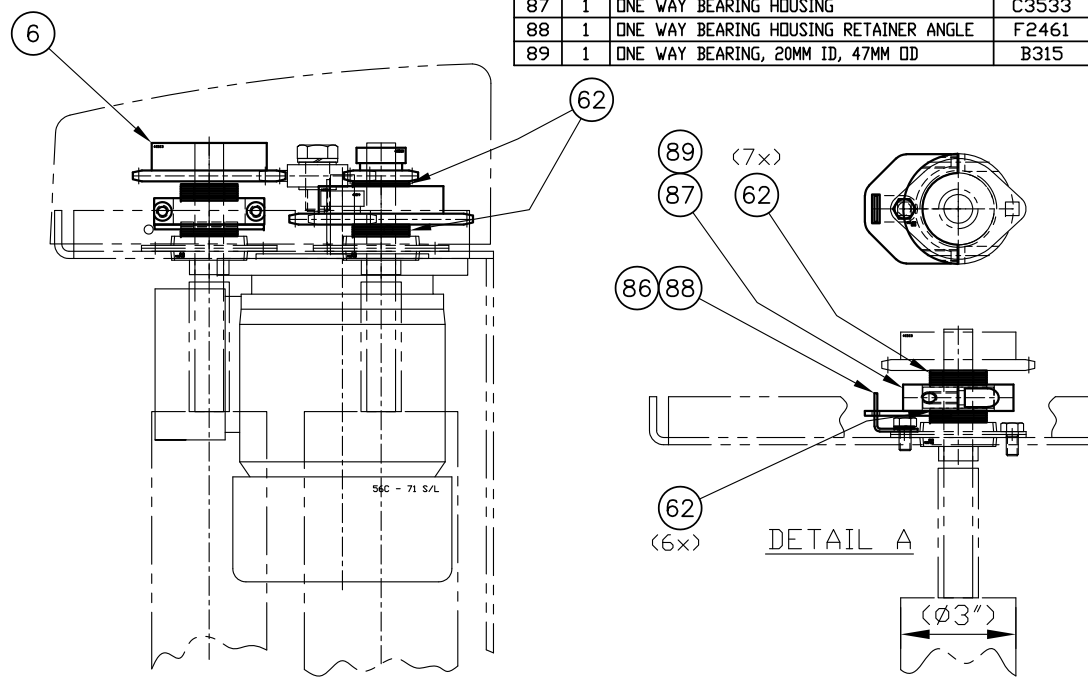
(*) OPTIONAL ITEMS

6	(1)	SPROCKET 40B15 x 20MM BORE K2SS	100%	K495
6	(1)	SPROCKET 40B19 x 20MM BORE K2SS	153%	K496
6	(1)	SPROCKET 40B21 x 20MM BORE K2SS	180%	K497
6	1	SPROCKET 40B23 x 20MM BORE K2SS	207%	K498
6	(1)	SPROCKET 40B25 x 20MM BORE K2SS	233%	K499
6	(1)	SPROCKET 40B26 x 20MM BORE K2SS	247%	K500
6	(1)	SPROCKET 40B27 x 20MM BORE K2SS	260%	K501
6	(1)	SPROCKET 40B28 x 20MM BORE K2SS	273%	K502
6	(1)	SPROCKET 40B29 x 20MM BORE K2SS	287%	K503
6	(1)	SPROCKET 40B30 x 20MM BORE K2SS	300%	K504
6	(1)	SPROCKET 40B31 x 20MM BORE K2SS	313%	K505

NOTES:
 - COMPONENT 4B REQ'D FOR HIGH SPEED FILM OUTPUT OPTION (QHSP).

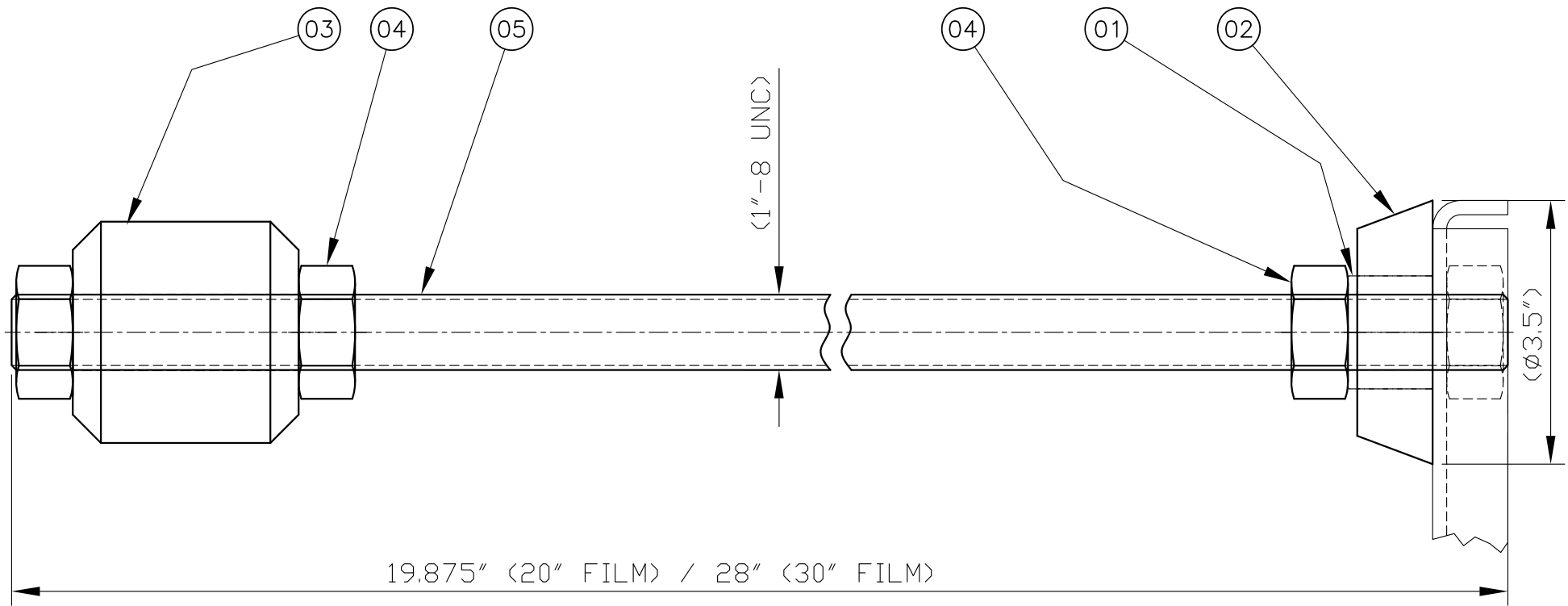
MATERIAL LIST

ITEM	QTY.	DESCRIPTION	PART No.
1			
2A	(1)	MOTOR 1/2 HP 90V DC, PM 1750 RPM, 56C	A294-1
2B	1	MOTOR 1/2 HP 230/460 V AC, 3 PH. 1725 RPM, 56C	A460/A135
2C	(1)	MOTOR 3/4 HP 230/460 V AC, 3 PH. 1725 RPM, 56C	A478
2D	(1)	MOTOR 1/2 HP 332/575 V AC, 3 PH. 1725 RPM, 56C	A568
2E	(1)	WASHDOWN MOTOR 1/2 HP 230/460VAC, 3PH. 1725 RPM, 56C	A246-1
2F	(1)	MOTOR 1/2 HP 230/460 V AC, 3 PH. 1750 RPM, 56C	A618
3	1	SPROCKET 40B9 x 5/8" BORE c/w KEYWAY & 2SS	K150
4A	1	SPROCKET 40B28 x 20MM BORE c/w KEYWAY & 2SS	K502
4B	(1)	SPROCKET 40B23 x 20MM BORE c/w KEYWAY & 2SS	K498
5	1	SPROCKET 40B10 x 20MM BORE c/w KEYWAY & 2SS	K494
* 6	1	SPROCKET 40B23 x 20MM BORE c/w KEYWAY & 2SS	K498
7A	1	IDLER SPROCKET 40A17 c/w 0.625" ID BALL BEARING	K227
7B	(1)	IDLER SPROCKET 40A17 c/w 0.625" ID BALL BEARING & SNAP RING	K571
8	1	CHAIN RC40 - 45 PITCHES LONG c/w CONN. LINK	K526
8A	(1)	C.R. CHAIN RC40 - 45 PITCHES LONG c/w CONN. LINK	K316-2
9	1	CHAIN RC40 - 45 PITCHES LONG c/w CONN. LINK	K526
9A	(1)	C.R. CHAIN RC40 - 45 PITCHES LONG c/w CONN. LINK	K316-2
60	1	CHAIN TENSIONER LEVER	C3166
61	1	HEX HEAD SCREW M16, 35MM LONG	H1403
62	20	NYLON FLAT WASHER 0.81" ID x 1.48" OD x .062" TK	H1486
81	1	HEX HEAD SCREW M12, 25MM LONG	H752
82	1	HEX HEAD SCREW M8, 40MM LONG	H1389
83	1	HEX NUT M8	H1214
84	1	LOCK WASHER FOR M12 SCREW	H1402
85	1	NYLON FLAT WASHER 0.625" ID x 1" OD x 0.0625" THK	H833
86	1	LOCK WASHER FOR M8 SCREW	H776
87	1	ONE WAY BEARING HOUSING	C3533
88	1	ONE WAY BEARING HOUSING RETAINER ANGLE	F2461
89	1	ONE WAY BEARING, 20MM ID, 47MM OD	B315



COUSINS PACKAGING INC.			
6A	ITEM 2F A618 ADDED	2022-08-05	TITLE SWITCH/SRT SERIES SUPER RAPID THREAD PRESTRETCH CARRIAGE PRESTRETCH DRIVE ASSEMBLY
6	REFER TO SHEET #1	SEPT.17/19	
5	REFER TO SHEET #1	DEC.14/18	
No.	DESCRIPTION	DATE	SCALE 1 : 2.5
REVISIONS		DATE	DATE AUGUST 28, 2013
		DRAWN BY	CHECKED BY
		SD	
DRAWING NO.			SHEET
G2900-117-00			2 OF 2
REVISION			REVISION
			6A

PART No. •



5B	(1)	THREADED ROD 1"-8 UNC x 28' LONG	H853
5A	1	THREADED ROD 1"-8 UNC x 19.875' LONG	H1463
4	4	JAM NUT 1"-8 UNC	H764
3	1	FILM ROLL SPINDLE TOP CHUCK	M79
2A	(1)	FILM ROLL SPINDLE BOTTOM CHUCK FOR 10' & 15' ROLL	M888
2	1	FILM ROLL SPINDLE BOTTOM CHUCK	M9-CM3
1A	(1)	FILM ROLL SPINDLE BOTTOM CHUCK BUSHING FOR 10' & 15' ROLL	M889
1	1	FILM ROLL SPINDLE BOTTOM CHUCK BUSHING	M9-CM4
ITEM	QTY.	DESCRIPTION	PART No.
MATERIAL LIST			

2	ITEM 3 WAS M9-CM12	NOV. 21/11
2	DIM. 19,875 WAS 18"	NOV. 21/11
1	ADDED OPTION FOR 30" FILM	JULY 11/05
No.	REVISION	DATE

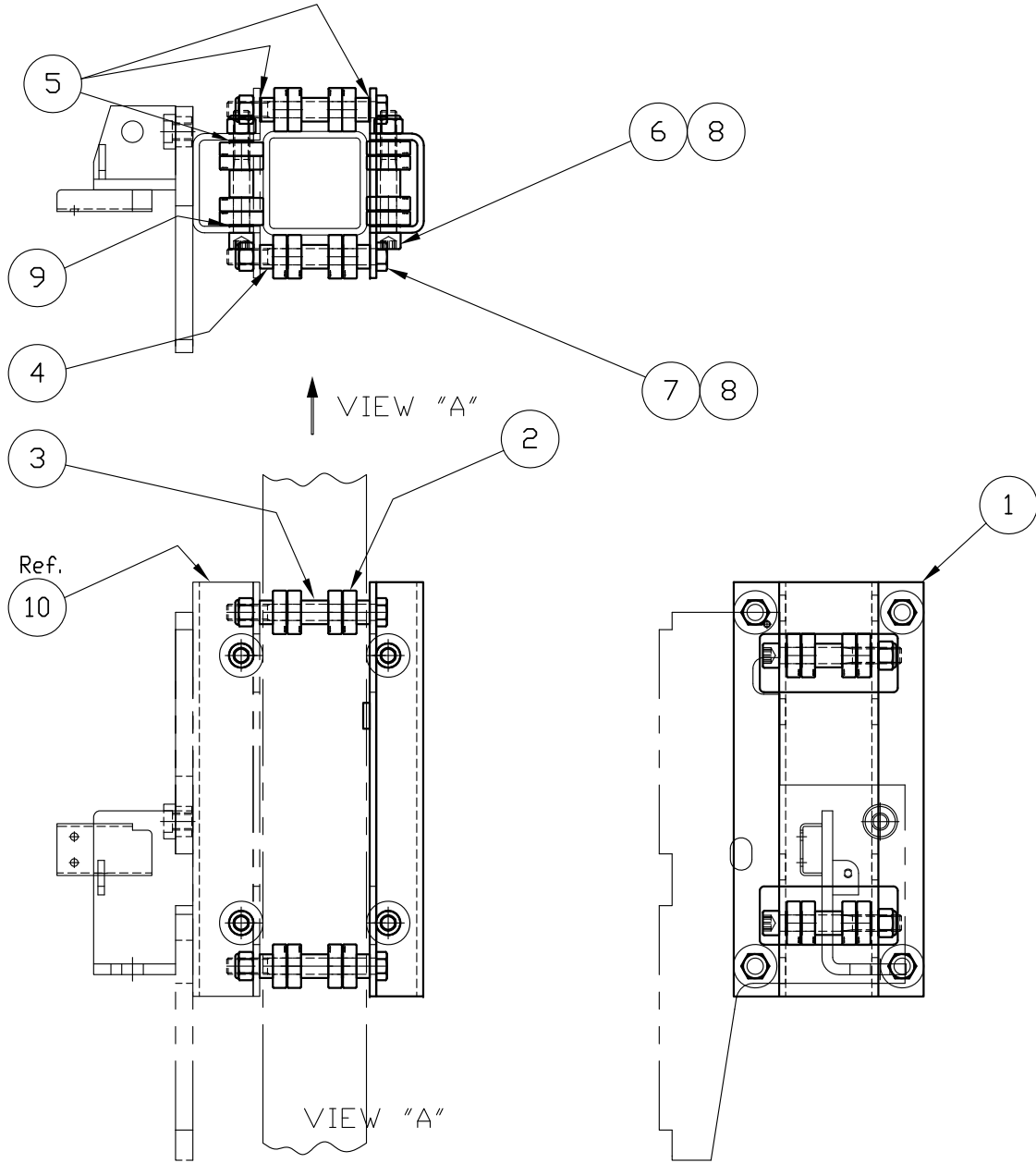
**COUSINS
PACKAGING**

SCALE: 1 : 2
 DATE: SEPT. 10, 2004
 DWN. BY: BR | CHK. BY:
 REV. BY: . | DATE: .

TITLE: RAPID THREAD CARRIAGE
 MANDREL FOR 20' / 30' FILM

DWG. No. G1700-007-00 | VC C | SHT. No. 1 OF 1 | REV. No. 2

PART No. **C4109**



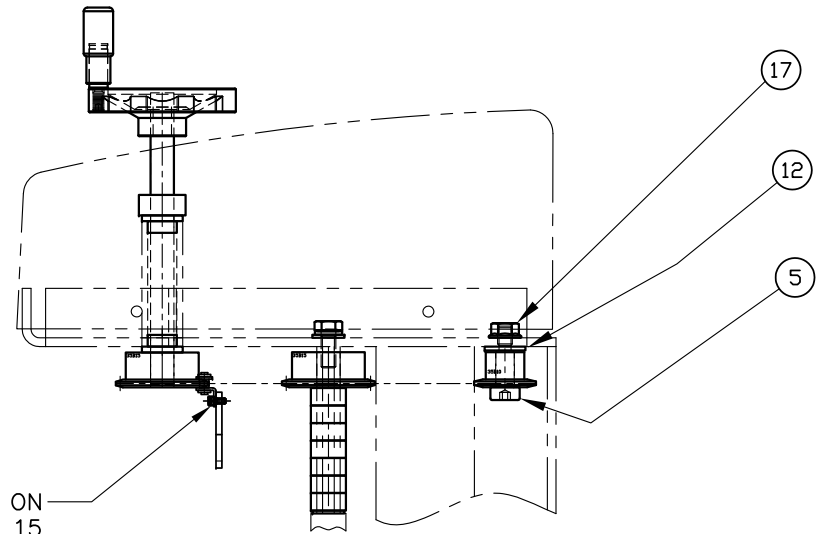
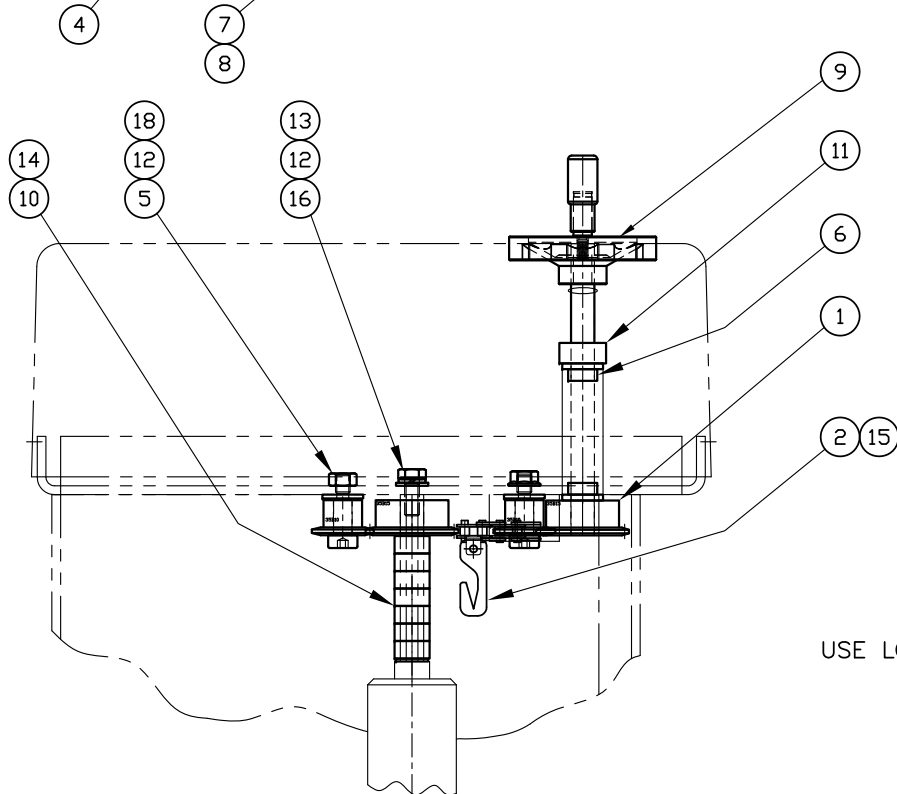
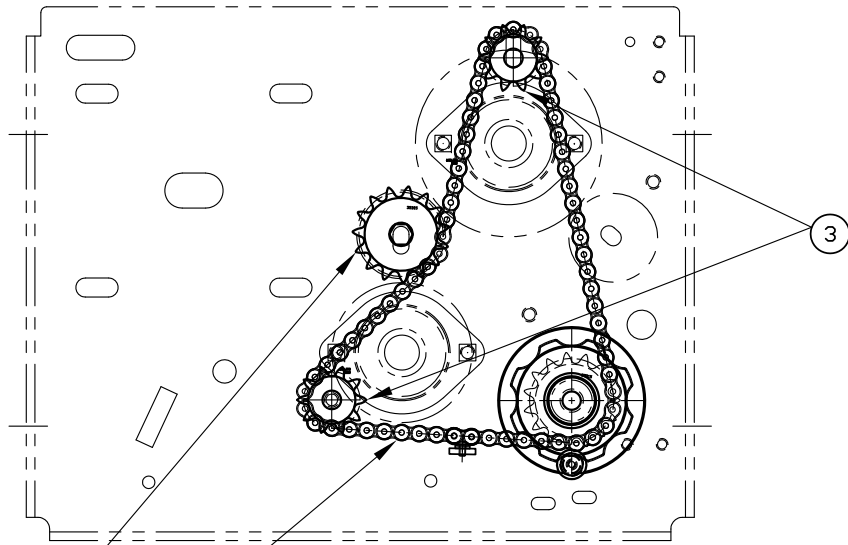
ITEM	QTY.	DESCRIPTION	PART No.
10	Ref.	CARRIAGE FRAME WELDMENT	G2900-117-01-00
9	4	FLAT WASHER 1/32" THK. (USE TRA815 HAND WRAPPER)	H1524
8	8	NYLON INSERT LOCK NUT M12	H1407
7	4	HEX CAP SCREW M12 - 110MM LONG	H1471
6	4	S.H.C.S. M12 - 90MM LONG	H1523
5	12	FLAT WASHER 1/16" THK.	H777
4	8	BEARING END SPACER (0.378" LG.)	M1142
3	8	BEARINGS MIDDLE SPACER (0.785" LG.)	M1141
2	32	BALL BEARING, 32MM/12MM/10MM - 6201	B128
1	1	CARRIAGE CARRIER PLATE, FREE SIDE	C4111

MATERIAL LIST

No.		REVISION	DATE	COUSINS PACKAGING	SCALE: 1:5	TITLE: SRT SERIES CARRIAGE ASSEMBLY CARRIAGE CARRIER PLATE ASSEMBLY				
					DATE: DECEMBER 8, 2015					
No.		REVISION	DATE	COUSINS PACKAGING	DWN. BY: DD	CHK. BY: .	DWG. No. C4109	VC C	SHT. No. 1 OF 1	REV. No. 0
					REV. BY: .	DATE: .				

MATERIAL LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	FILM THREADING DRIVE SPROCKET WELDMENT	C3165
2	1	FILM HOOK	F382-R3
3	2	SPROCKET 35B10, 10MM BORE	K516
4	1	SPROCKET 35B15, 1/2" BORE	K333
5	2	SHOULDER BOLT 10MM DIA. x 20MM LG, M8-1.25	H1373
6	2	BRONZE FLANGE BUSHING 1/2" ID x 5/8" OD x 3/8" LG.	B102
7A	1	CHAIN #35, 67 LINKS LONG,	K110
7B	(1)	CORROSION RESISTANT CHAIN #35, 67 LINKS LONG	K517
8	1	CONNECTING LINK c/w ATTACHMENT B1	K331
9	1	HANDWHEEL WITH REVOLVING HANDLE	X231
10	7	NYLON SPACER, 1/2" ID x 3/4" OD x 3/8" LG.	H1011
11	1	SHAFT COLLAR 1/2" I.D.	Q114
12	3	FLAT WASHER FOR SCREW M8	H775
13	1	LOCK WASHER FOR SCREW M8	H776
14	1	NYLON SPACER, 1/2" ID x 11/16" OD x 1/16" LG.	H1318
15	1	S. H. C. S. #4-40 UNC x 1/4" LG.	H1660
16	1	HEX CAP SCREW M8 - 20MM LONG	H1399
17	1	HEX LOCK-NUT FLANGED, M8	H1459
18	1	HEX NUT M8	H1214



USE LOCTITE ON
ITEM 15

2		ITEM 2 WAS RI, ITEM 8 WAS DRILLED	SEPT 11/17	SCALE 1 : 2		TITLE SWITCH SERIES SUPER PRESTRETCH CARRIAGE ASSEMBLY	
2		ITEM 15 WAS BHLS. 6-32 UNCL/4 LG.	SEPT 11/17	DATE APRIL 24, 2013		FILM THREADING ASSEMBLY	
1		ITEM 2 WAS RO	JUN.06/14	DRAWN BY SD		CHECKED BY RMP	
No.		DESCRIPTION	DATE	DRAWING No.		SHEET 1 OF 1	
REVISIONS				C3556		REVISION 2	

COUSINS PACKAGING INC.

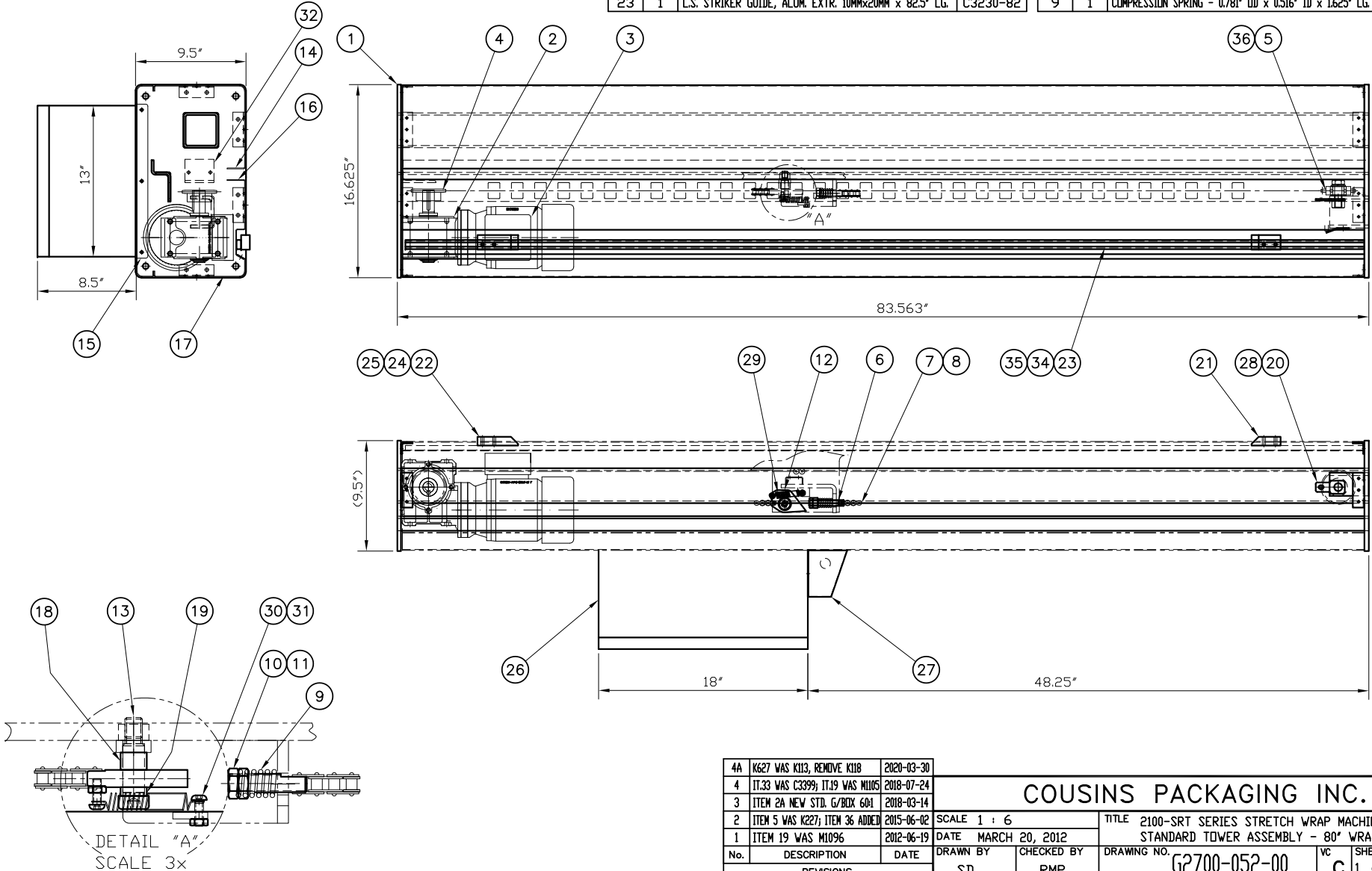
TITLE SWITCH SERIES SUPER PRESTRETCH CARRIAGE ASSEMBLY
FILM THREADING ASSEMBLY

DRAWING No. **C3556** SHEET 1 OF 1 REVISION 2

24	4	ALUM. EXTRUSION NUT, M6	X234
25	4	BUTTON HEAD SCREW, M6 x 25MM LG.	H1395
26	1	CONTROL PANEL	T.B.A.
27	1	CONTROL PANEL TO TOWER CABLE COVER	F1429-R3
28	1	8MM PROXIMITY SENSOR	E1583
29	1	EXT. SPRING 0.5" DD x 1.75" LG. RATE: 14 LB/IN	V175
30	2	BUTTON HEAD SCREW M6 x 20MM LONG	H1427
31	2	HEX NUT M6	H820
32	1	GEARBOX SHAFT STOPPER ANGLE	C3371
33	1	CABLE CHAIN, 43 PITCHES LONG (NOT SHOWN)	E2884
34	2	F.H.S.S. M4 X 6MM LONG	H1396
35	2	S.H.C.S. M4 X 6MM LONG	H1557
36	1	FLAT WASHER SAE 5/8" BOLT	H794

10	1	HEX NUT 1/2"-13 UNC	H755
11	1	JAM NUT 1/2"-13 UNC	H754
12	1	ANTI-FALL SAFETY LATCH	F2117-R5
13	1	SHOULDER BOLT 5/8" DIA. X 1.5" LONG	H1302
14	1	TOWER FRONT COVER	F2247
15	1	CONTROL PANEL SIDE, TOWER COVER	F2246-R2
16	1	TOWER MIDDLE COVER	F2248-R1
17	1	TOWER BACK COVER	F2249-R2
18	1	LATCH SPACER 1/2" LONG	M1095
19	1	LATCH SPACER 1/4" LONG	M1096
20	1	BRACKET FOR 8MM PROX. SENSOR (IF NOT WELDED)	F1981-R3
21	1	LIMIT SWITCH STRIKER - LOWER	M850-R3
22	1	LIMIT SWITCH STRIKER - UPPER	M851-R4
23	1	L.S. STRIKER GUIDE, ALUM. EXTR. 10MMx20MM x 82.5" LG.	C3230-B2

ITEM	QTY.	DESCRIPTION	PART No.
1	1	TOWER FRAME WELDMENT	G2700-052-01-00
2	(1)	GEARBOX "NORD"-SKIS150, 50:1 RATIO, 1" OUTPUT SHAFT	A462
2A	1	GEARBOX "NORD"-SKIS150, 60:1 RATIO, 1" OUTPUT SHAFT	A606
3	1	MOTOR IEC-C105 1/2" HP, 230/460V AC, 60Hz, 3 PHASE	A461
3A	1	WASHDOWN MOTOR IEC-C105 1/2" HP, 230/460VAC	A570
4	1	SPROCKET 40B17, 1" BORE, K2SS	K174
5	1	BALL BEARING IDLER SPROCKET, 40A17 c/w SNAP RING	K571
6	1	CHAIN ATTACHMENT BOLT	C3325
7	1	CHAIN ANSI #40 - 315 PITCHES LONG + 2 CONN. LINKS + 1 HALF LINK	K627
7A	(1)	CORROSION RESISTANT CHAIN ANSI #40, 13.21' LONG	K316-2
8	(2)	CORROSION RESISTANT #40 CHAIN CONNECTING LINK	K317-2
.	.	.	.
9	1	COMPRESSION SPRING - 0.781" DD x 0.516" ID x 1.625" LG.	V103



No.	DESCRIPTION	DATE
4A	K627 WAS K113, REMOVE K118	2020-03-30
4	IT.33 WAS C3399; IT.19 WAS M1095	2018-07-24
3	ITEM 2A NEW STD. G/BOX 601	2018-03-14
2	ITEM 5 WAS K227; ITEM 36 ADDED	2015-06-02
1	ITEM 19 WAS M1096	2012-06-19

COUSINS PACKAGING INC.

SCALE 1 : 6	TITLE 2100-SRT SERIES STRETCH WRAP MACHINE
DATE MARCH 20, 2012	STANDARD TOWER ASSEMBLY - 80" WRAP HEIGHT
DRAWN BY SD	DRAWING NO. G2700-052-00
CHECKED BY RMP	VC C
	SHEET 1 OF 1
	REVISION 4A

14:0

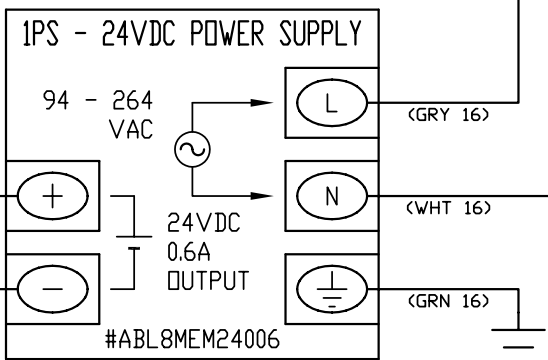
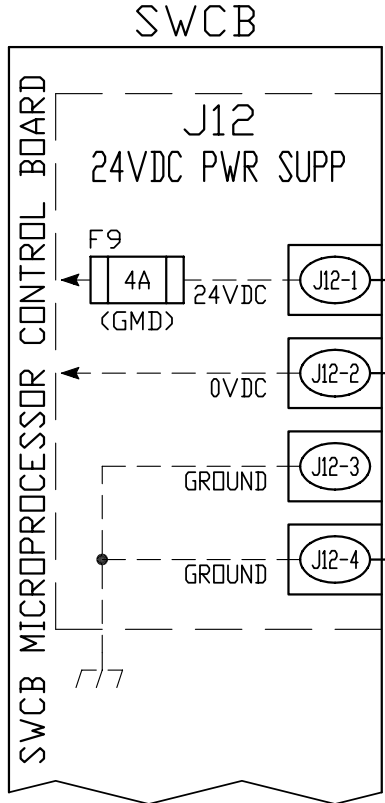
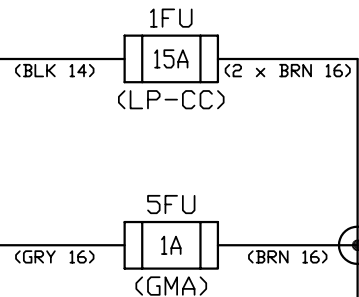
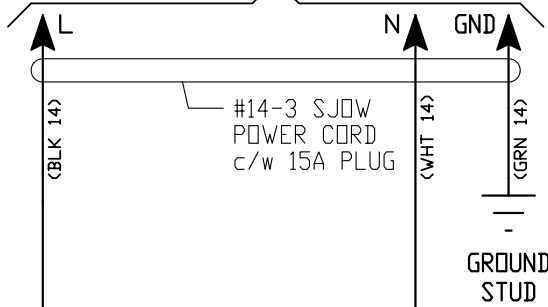
**E
L
E
C
T
R
I
C
A
L

D
R
A
W
I
N
G
S**

2100-SRT SEMI-AUTO with:
- 115 VOLT 1 PHASE 60 HZ SUPPLY

120V / 1 PH / 60 HZ - 15 AMP SERVICE

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18



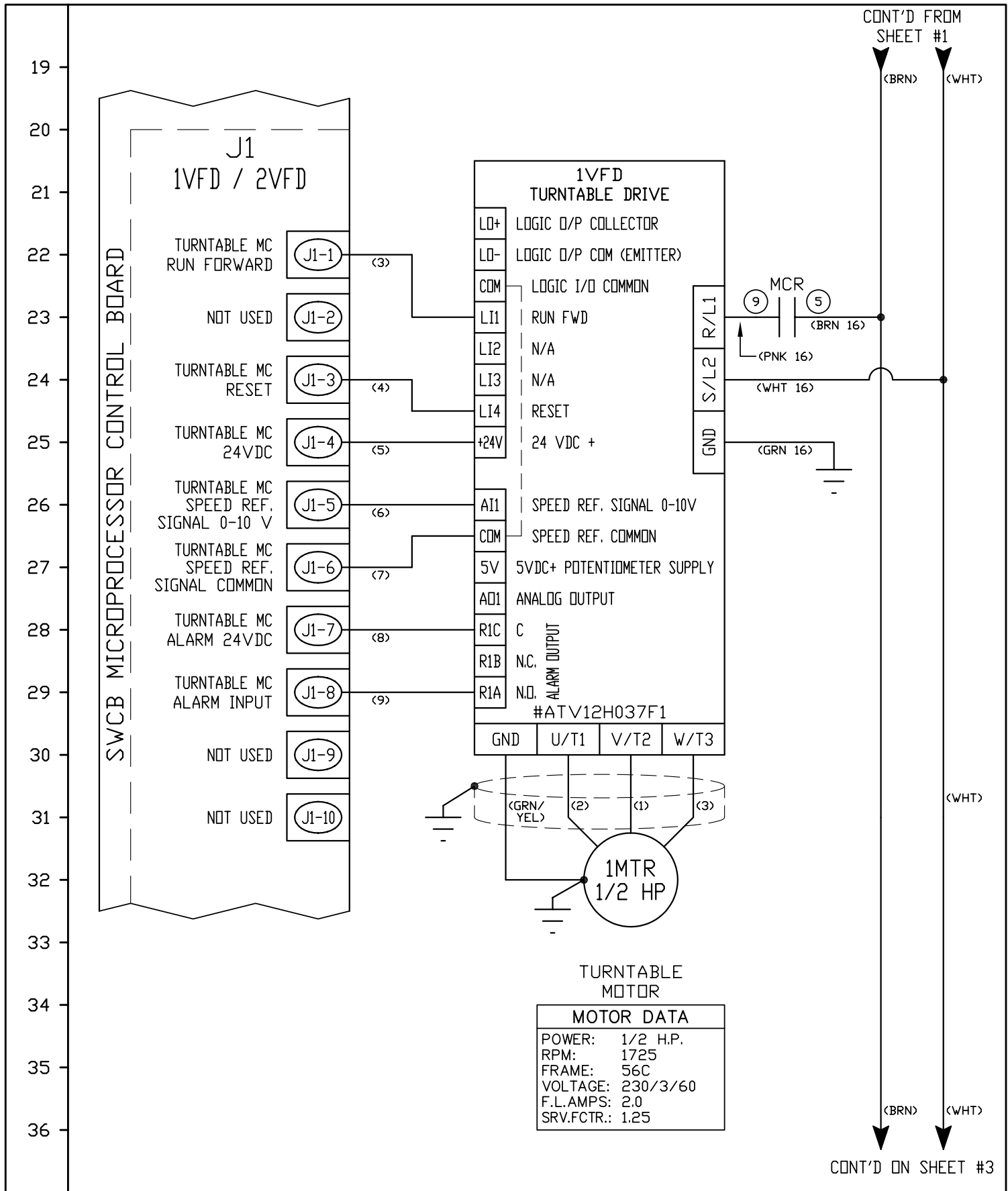
CONT'D ON SHEET #2

**COUSINS
PACKAGING**

SCALE: NOT TO SCALE
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: . | DATE: .

TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC
DWG. No. E2100-188
SHT. No. 1 OF 12
REV. No. 0

CONT'D FROM SHEET #1
(BRN) (WHT)



TURNTABLE MOTOR

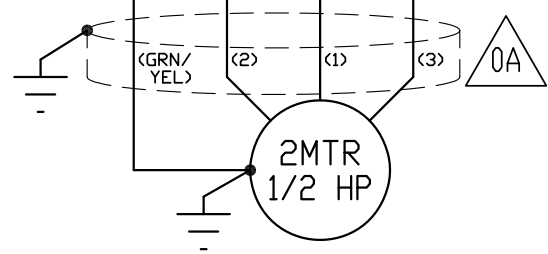
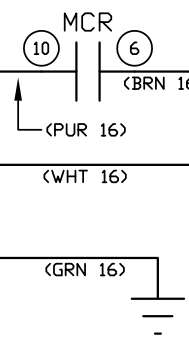
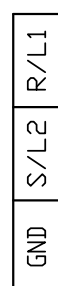
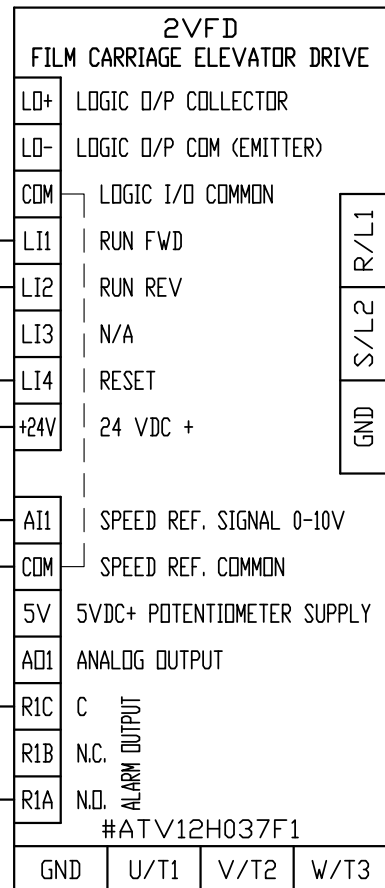
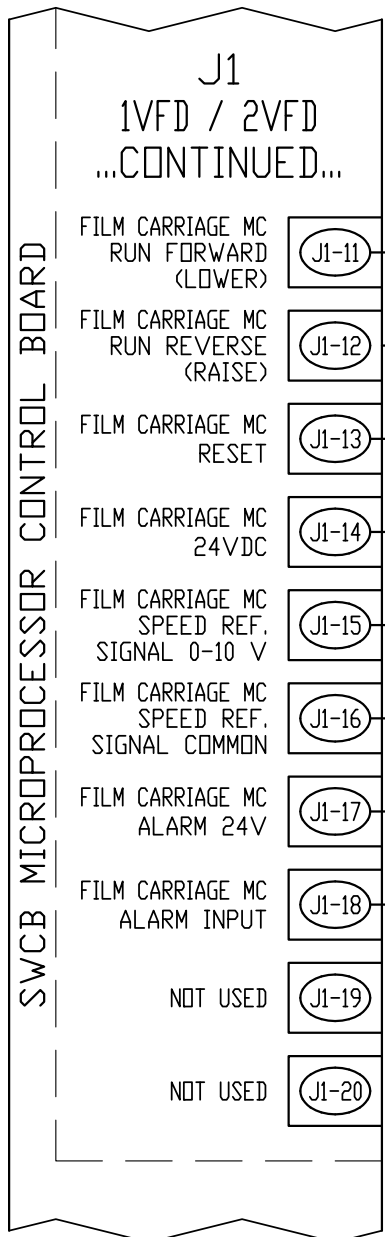
MOTOR DATA	
POWER:	1/2 H.P.
RPM:	1725
FRAME:	56C
VOLTAGE:	230/3/60
F.L.AMPS:	2.0
SRV.FCTR.:	1.25

CONT'D ON SHEET #3
(BRN) (WHT)

COUSINS PACKAGING	SCALE: NOT TO SCALE		TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC			
	DATE: DEC. 5, 2011					
	DWN. BY: RMP	CHK. BY:	DWG. No. E2100-188	SHT. No. 2 OF 12	REV. No. 0	
	REV. BY: .	DATE: .				

CONT'D FROM SHEET #2
(BRN) (WHT)

37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54



FILM CARRIAGE ELEVATOR MOTOR

MOTOR DATA	
POWER:	1/2 H.P.
RPM:	1725
FRAME:	56C
VOLTAGE:	230/3/60
F.L.AMPS:	2.0
SRV.FCTR.:	1.25

(BRN) (WHT)

CONT'D ON SHEET #4

**COUSINS
PACKAGING**

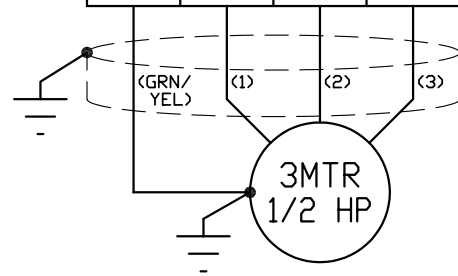
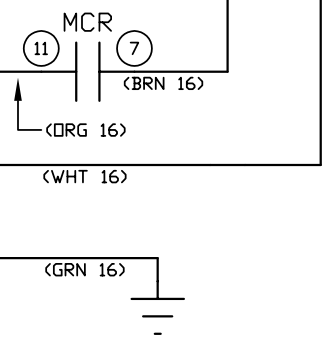
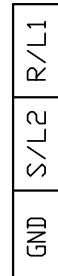
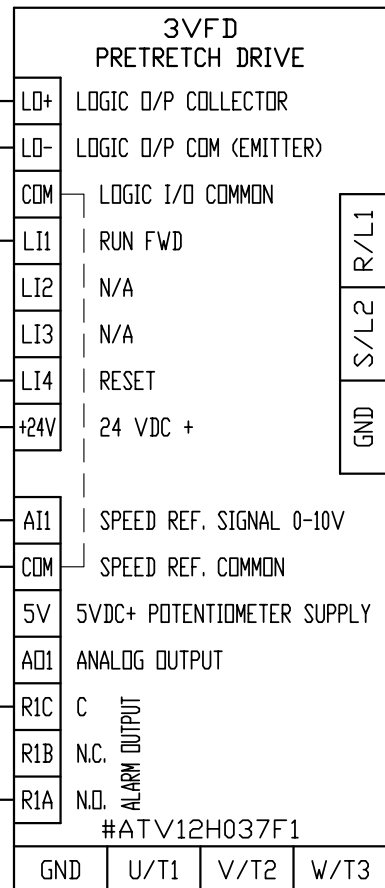
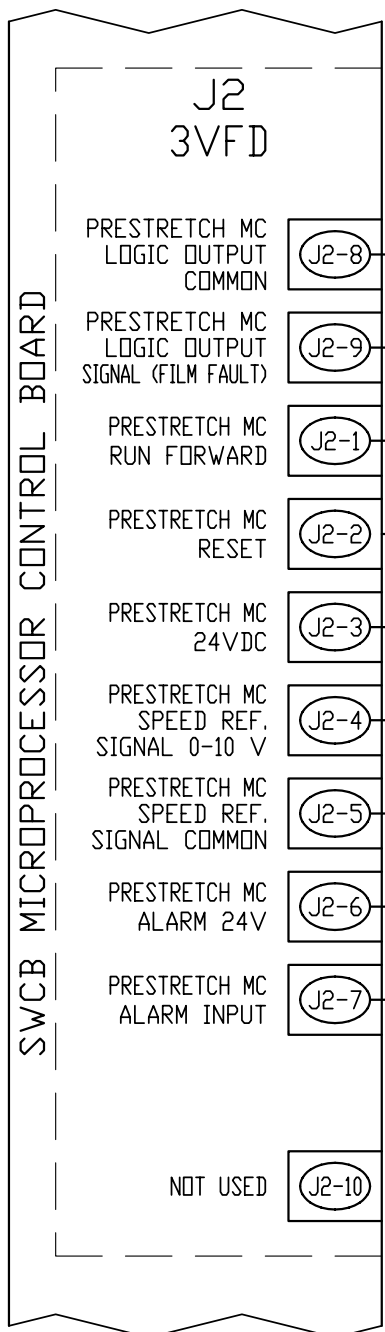
SCALE: NOT TO SCALE
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: RMP | DATE: 2014-02-20

TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC
DWG. No. E2100-188

SHT. No. 3 OF 12 | REV. No. 0A

CONT'D FROM SHEET #3
 (BRN) (WHT)

SWCB MICROPROCESSOR CONTROL BOARD



PRESTRETCH MOTOR

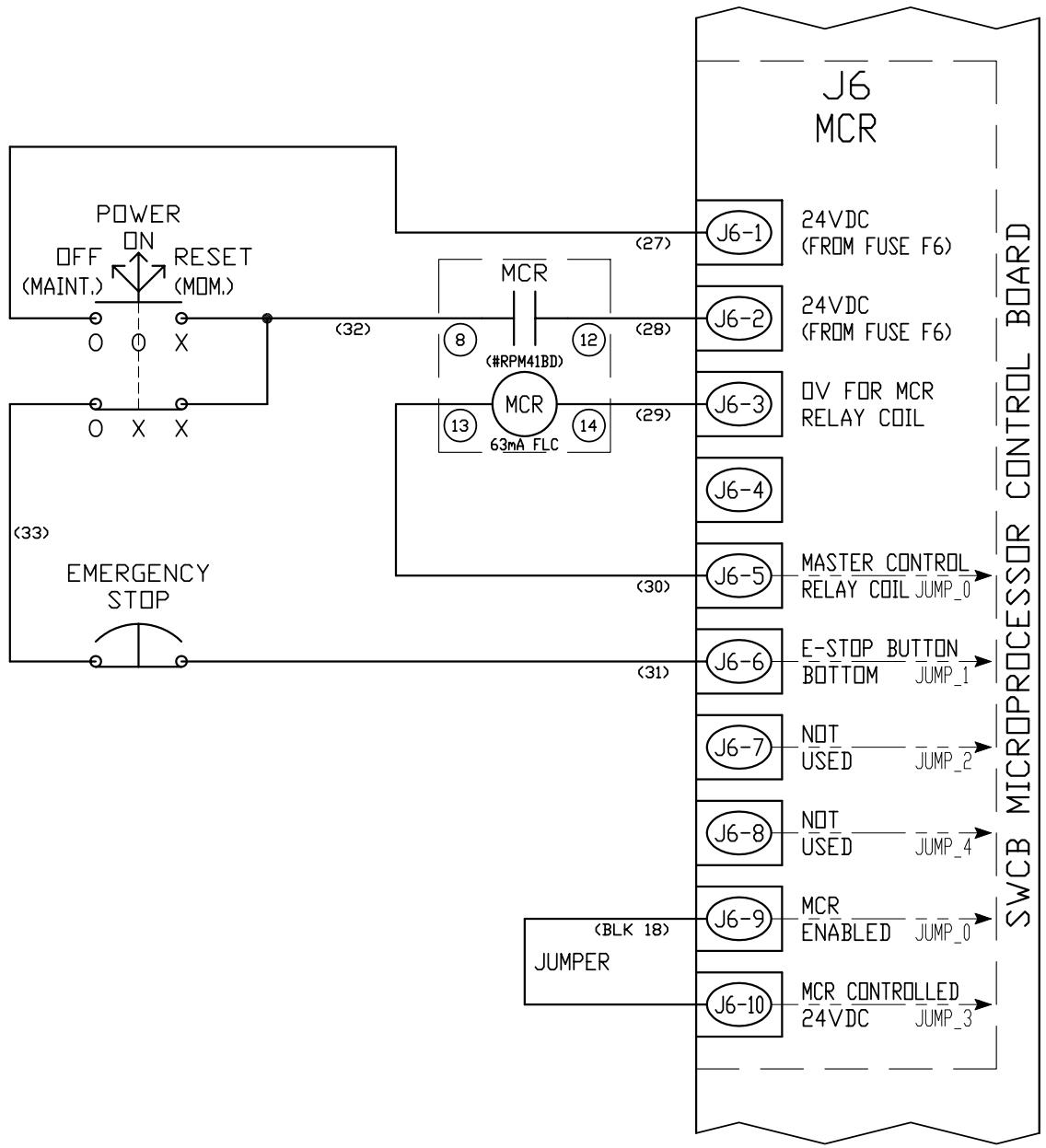
MOTOR DATA	
POWER:	1/2 H.P.
RPM:	1725
FRAME:	56C
VOLTAGE:	230/3/60
F.L.AMPS:	2.0
SRV.FCTR.:	1.25

COUSINS PACKAGING

SCALE: NOT TO SCALE
 DATE: DEC. 5, 2011
 DWN. BY: RMP | CHK. BY:
 REV. BY: . | DATE: .

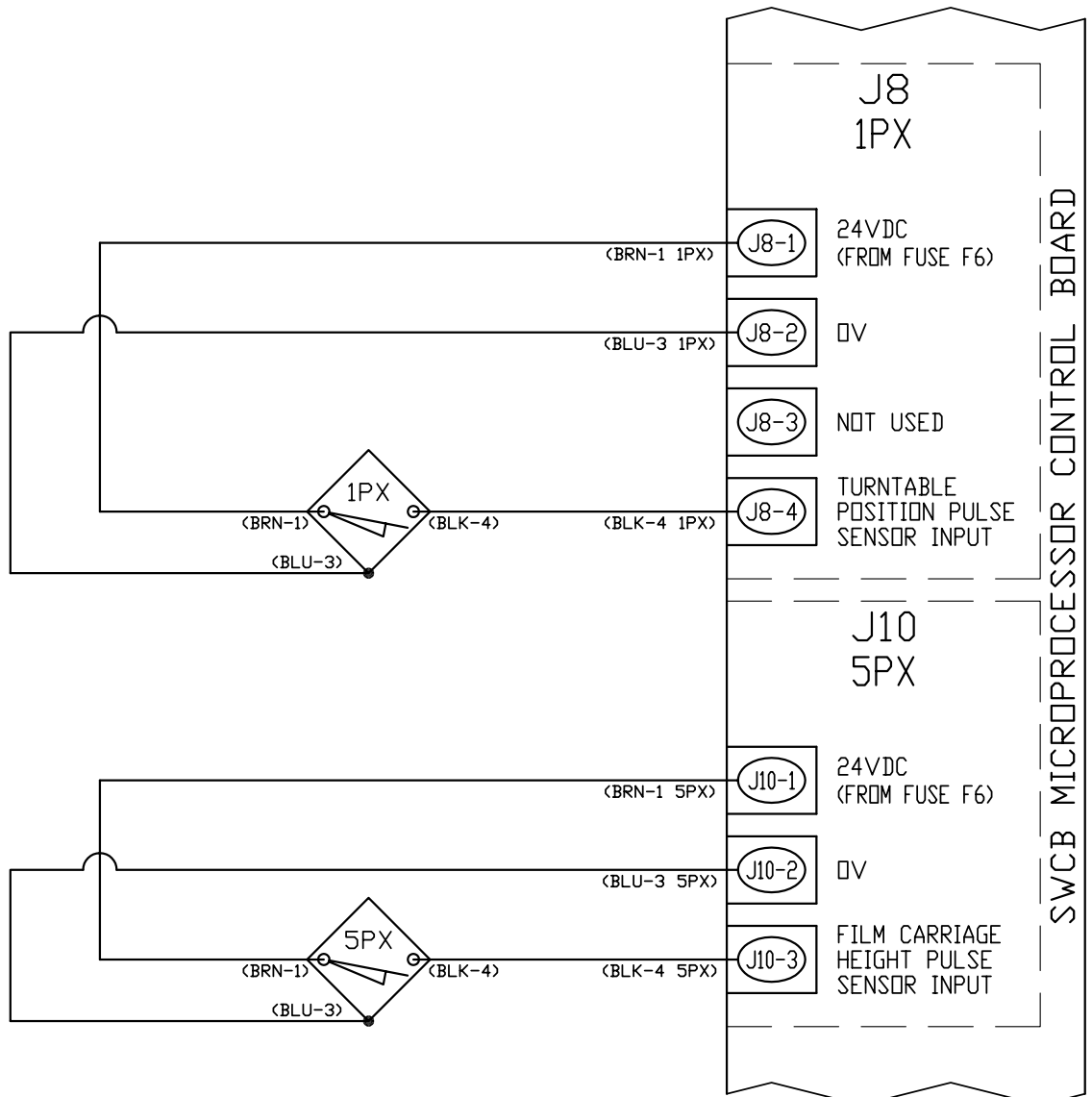
TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
 c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC
 DWG. No. E2100-188
 SHT. No. 4 OF 12
 REV. No. 0

73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90



COUSINS PACKAGING	SCALE: NOT TO SCALE		TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC		
	DATE: DEC. 5, 2011				
	DWN. BY: RMP	CHK. BY:	DWG. No. E2100-188	SHT. No. 5 OF 12	REV. No. 0
	REV. BY: .	DATE: .			

91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108

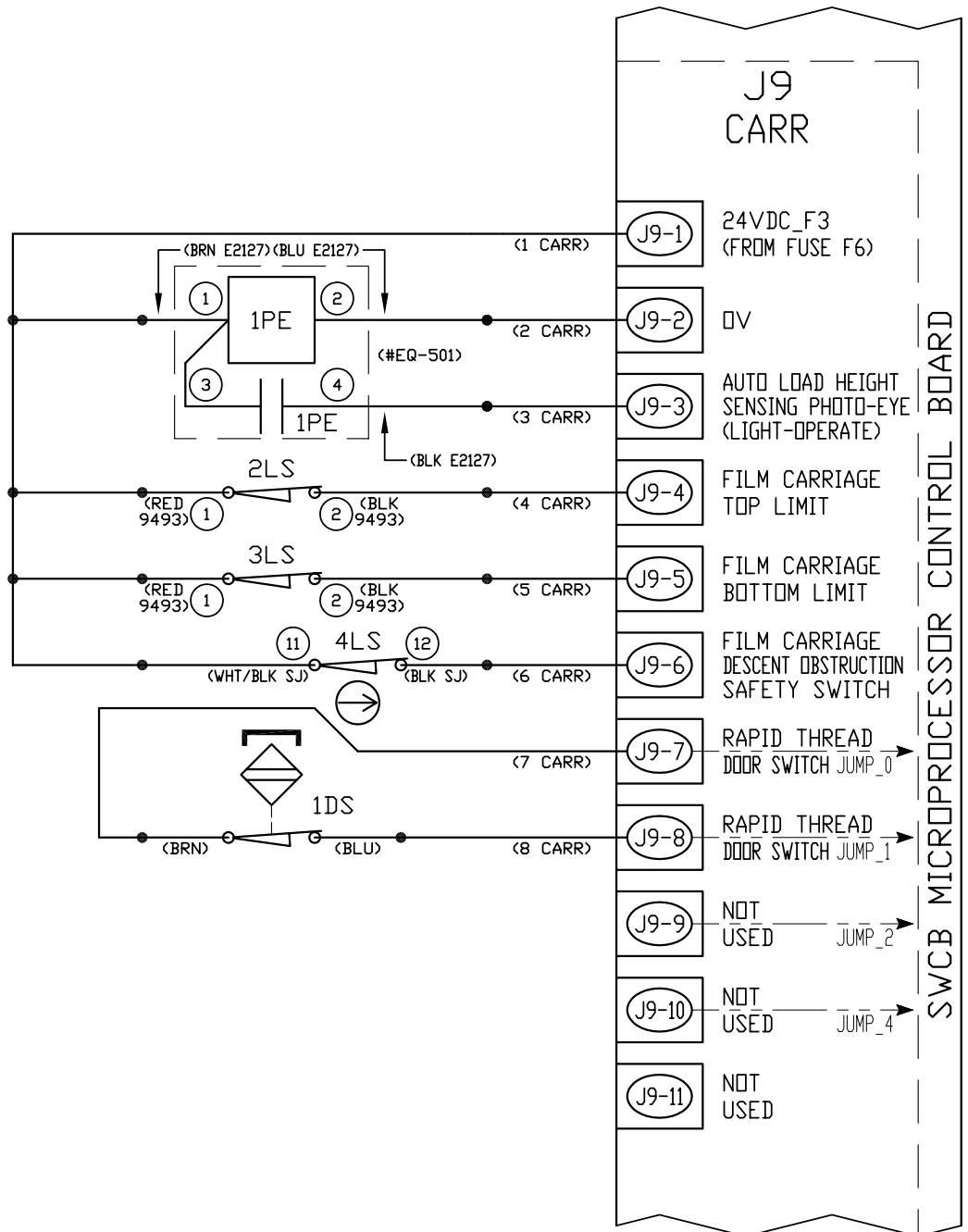


**COUSINS
PACKAGING**

SCALE: NOT TO SCALE
 DATE: DEC. 5, 2011
 DWN. BY: RMP | CHK. BY:
 REV. BY: . | DATE: .

TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
 c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC
 DWG. No. E2100-188
 SHT. No. 6 OF 12
 REV. No. 0

109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126

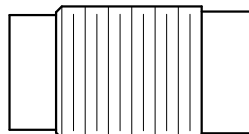


SWCB MICROPROCESSOR CONTROL BOARD

COUSINS PACKAGING	SCALE: NOT TO SCALE		TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE		
	DATE: DEC. 5, 2011		c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC		
	DWN. BY: RMP	CHK. BY:	DWG. No. E2100-188	SHT. No. 7 OF 12	REV. No. 0
	REV. BY: .	DATE: .			

127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144

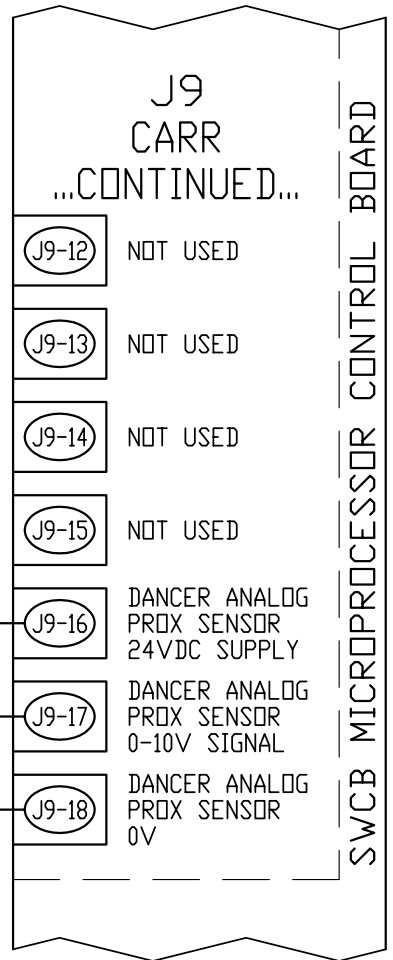
3PX - DANCER ANALOG
PROXIMITY SENSOR



(BRN) (9 CARR)

(BLK) (10 CARR)

(BLU) (11 CARR)



**COUSINS
PACKAGING**

SCALE: NOT TO SCALE
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: . DATE: .

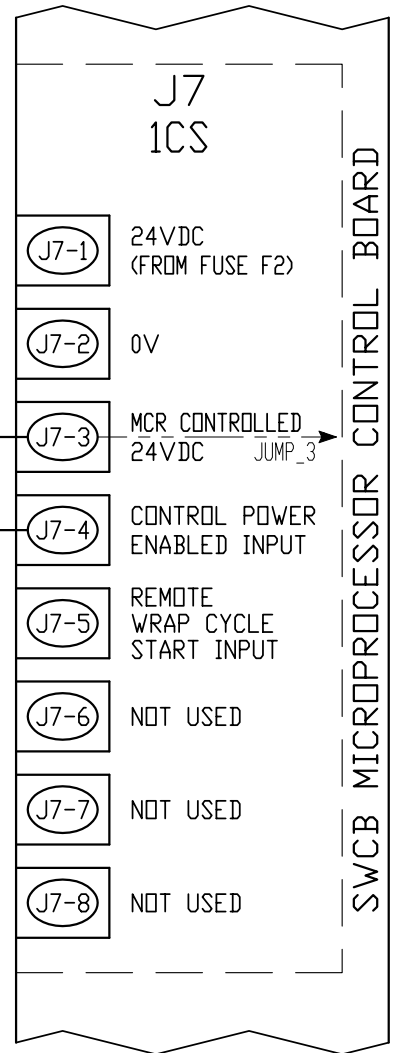
TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC

DWG. No. E2100-188

SHT. No. 8 OF 12

REV. No. 0

145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162



JUMPER

**COUSINS
PACKAGING**

SCALE: NOT TO SCALE
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: . DATE: .

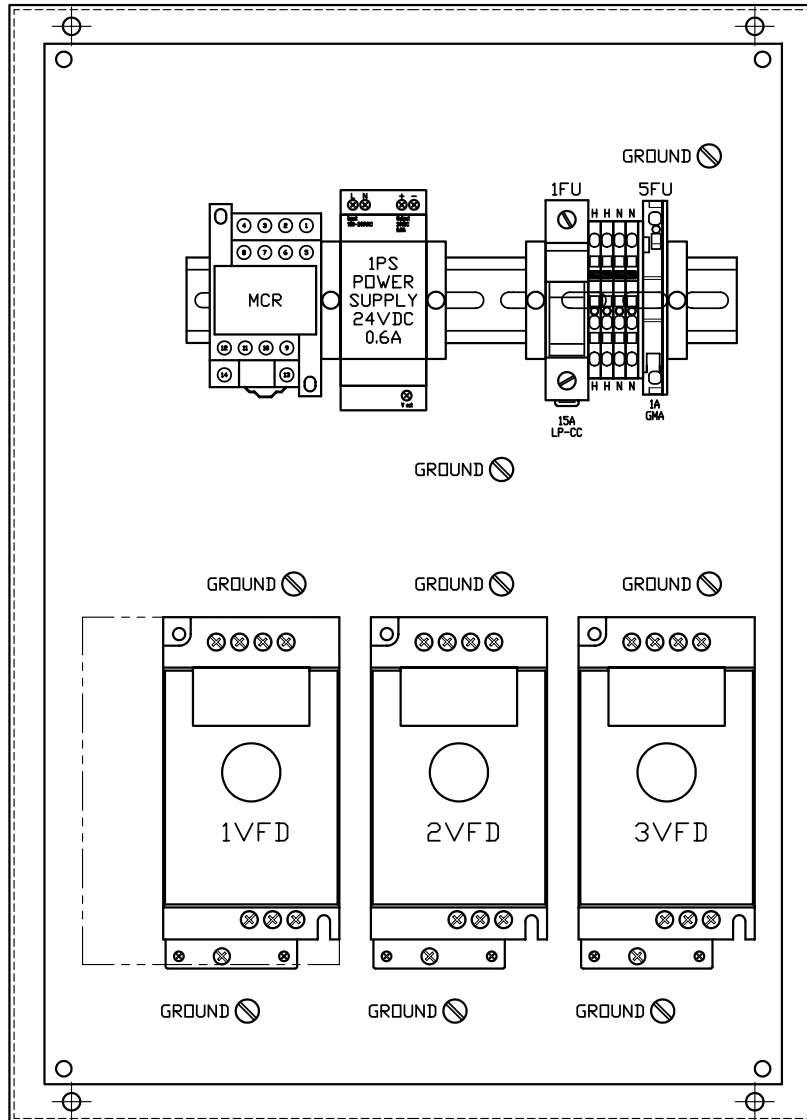
TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - ELECTRICAL SCHEMATIC

DWG. No. E2100-188

SHT. No. 9 OF 12

REV. No. 0

163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180



**COUSINS
PACKAGING**

SCALE: NOT TO SCALE
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: . | DATE: .

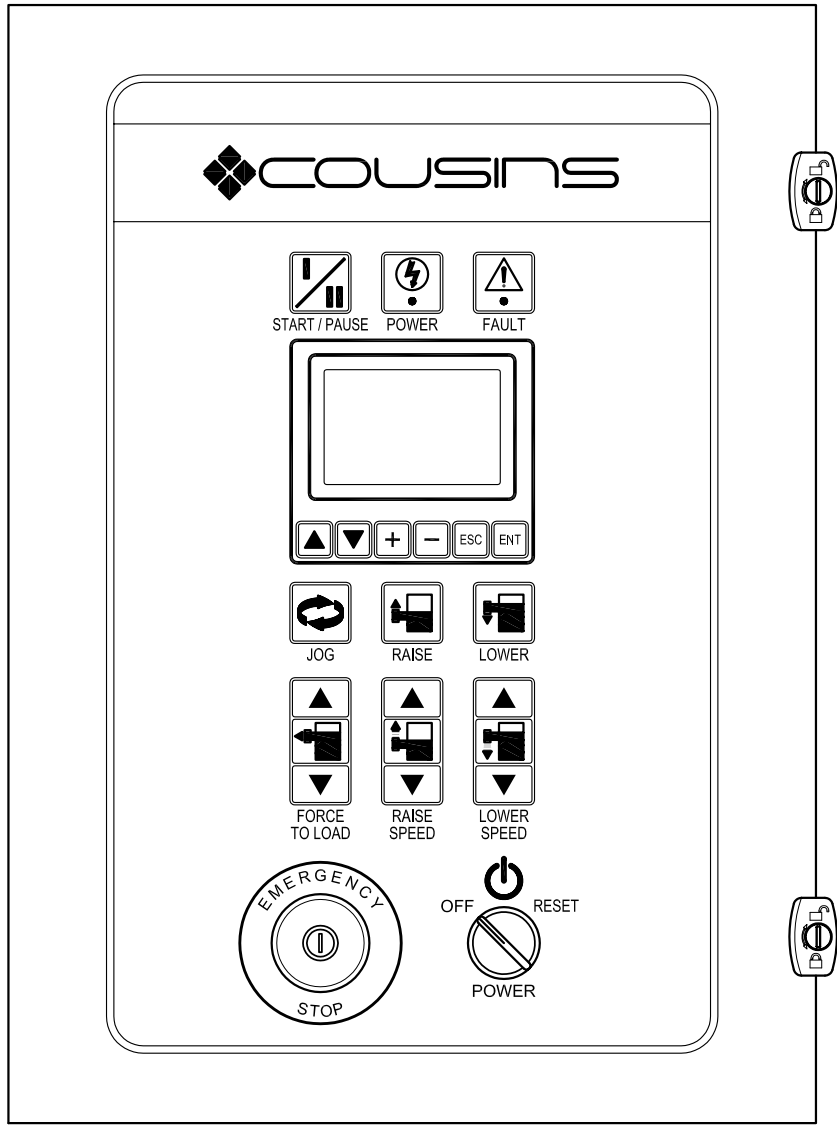
TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - INNER PANEL LAYOUT

DWG. No. E2100-188

SHT. No. 10 OF 12

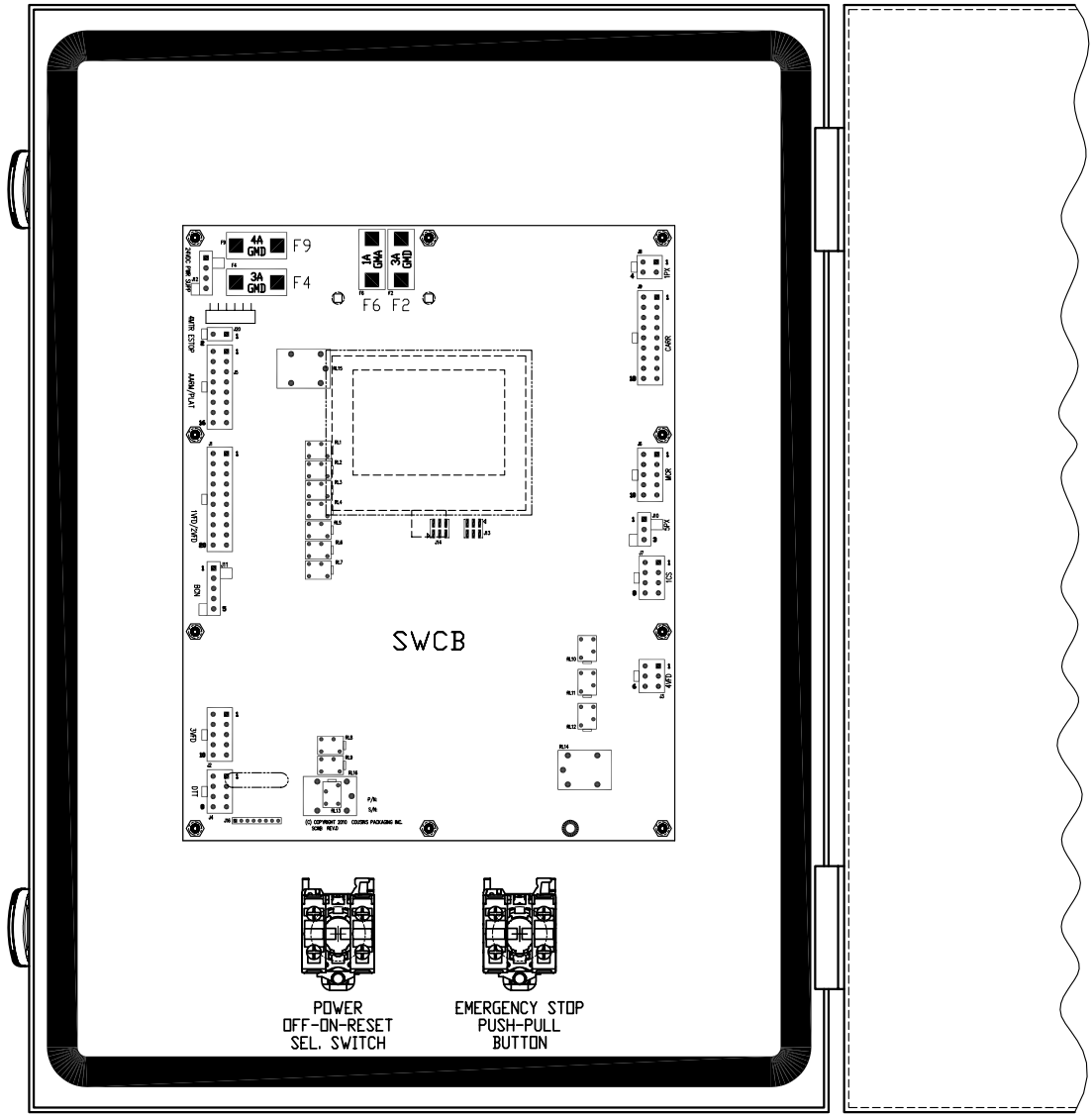
REV. No. 0

181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198



COUSINS PACKAGING	SCALE: NOT TO SCALE		TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE c/w MICROPROCESSOR CONTROL - PANEL DOOR OUTSIDE LAYOUT			
	DATE: DEC. 5, 2011					
	DWN. BY: RMP	CHK. BY:	DWG. No.	E2100-188	SHT. No. 11 OF 12	REV. No. 0
	REV. BY: .	DATE: .				

199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216



**COUSINS
PACKAGING**

SCALE: 1 : 3
DATE: DEC. 5, 2011
DWN. BY: RMP | CHK. BY:
REV. BY: . | DATE: .

TITLE: MODEL 2100-SRT SEMI-AUTOMATIC STRETCH WRAP MACHINE
c/w MICROPROCESSOR CONTROL - PANEL DOOR INSIDE LAYOUT
DWG. No. E2100-188
SHT. No. 12 OF 12
REV. No. 0

15:0

**V
F
D

P
A
R
A
M
E
T
E
R
S**

E2100-188 Altivar 12 AC Variable Speed Drive Parameters										
PARAMETER CODE					PARAMETER DESCRIPTION	1VFD TURNTABLE	2VFD FILM CARR. ELEVATOR	3VFD PRESTRETCH		
MENU LEVEL 1	MENU LEVEL 2	MENU LEVEL 3	MENU LEVEL 4	MENU LEVEL 5						
Light green shaded cells indicate default factory settings										
FIRST LEVEL ADJUSTMENT PARAMETERS										
ConF					Configuration Menu					
	bFr				Standard Motor Frequency	60 Hz	60 Hz	60 Hz		
	Fr1				Reference Channel 1 (AI1 = terminal)	AI1	AI1	AI1		
	ACC				Acceleration time	4.0 sec.	0.5 sec.	0.1 sec.		
	dEC				Deceleration time	4.0 sec.	0.1 sec.	0.1 sec.		
	LSP				Low speed (motor freq. @ min. reference)	0.0 Hz	5.0 Hz	0.0 Hz		
	HSP				High speed (motor freq. @ max. reference)	60.0 Hz	60.0 Hz	40.0 Hz		
	nPr				Rated Motor Power (HP)	0.5 HP	0.5 HP	0.5 HP		
	nCr				Nominal motor current on nameplate	2.0 Amps	2.0 Amps	2.0 Amps		
	AI1t				AI1 Type	10V	10V	10V		
	SCS				Store customer parameter set	nO	nO	nO		
	FCS				Factory / recall customer paramter set	nO	nO	nO		
SECOND LEVEL ADJUSTMENT PARAMETERS										
	FULL				Macro-configuration (not used - skip this)					
		CFG			Input Output Menu					
		I_O -								
			tCC		Type of Control (press the "ENT" key for 2 sec. to change)	2C	2C	2C		
			tCt		2-wire type control - This parameter is only accessible if tCC = 2C.	LEL	LEL	LEL		
			nPL		Logic inputs type	POS	POS	POS		
			AI1 -		Configuration of the analog input					
				AI1t	AI1 type	10V	10V	10V		
				CrLI	AI1 current scaling parameter of 0%	N/A	N/A	N/A		
				CrHI	AI1 current scaling parameter of 100%	N/A	N/A	N/A		
				r1	R1 assignment	FLt	FLt	FLt		
			LO1 -		LO1 configuration menu					
				LO1	LO1 assignment	nO	nO	FtA		
				LO1S	LO1 status	POS	POS	POS		
				tOL	Application Overload time delay	0 sec.	0 sec.	0 sec.		
				Ult	Application Underload threshold	0 sec.	0 sec.	0 sec.		
				Ftd	Motor Frequency threshold	N/A	N/A	3.0 Hz		
			AO1 -		AO1 configuration menu					
				AO1	AO1 assignment	nO	nO	nO		
				AO1t	AO1 type	0A	0A	0A		
			drC -		Motor Control menu					
				bFr	Standard motor frequency	60 Hz	60 Hz	60 Hz		
				nPr	Rated motor power (HP)	0.5 HP	0.5 HP	0.5 HP		
				UnS	Nominal motor voltage on nameplate	230 Volt	230 Volt	230 Volt		
				nCr	Nominal motor current on nameplate	2.0 Amps	2.0 Amps	2.0 Amps		
				FrS	Nominal motor frequency on nameplate	60.0 Hz	60.0 Hz	60.0 Hz		
				nSP	Rated motor speed	1720	1720	1720		
				tFr	Maximum frequency	72.0 Hz	72.0 Hz	72.0 Hz		
				Ctt	Motor control type	Std	PErF	PErF		
				UFR	IR compensation	100 %	100 %	100 %		
				SLP	Slip compensation	100 %	100 %	100 %		
				StA	Frequency loop stability (only if Ctt = PErF)	N/A	15%	28%		
				FLG	Frequency loop gain (only if Ctt = PErF)	N/A	25%	12%		
				SFr	Switching frequency	4.0 Hz	4.0 Hz	4.0 Hz		
				SFt	Switching frequency type	HF1	HF1	HF1		
				nrd	Motor noise reduction	nO	nO	nO		
				tUn	Auto-tuning	yES	yES	yES		
				MPC	Motor parameter choice	nPr	nPr	nPr		
			CtL -		Control menu					
				Frl	Reference channel 1	AI1	AI1	AI1		
				LFr	External reference value	-	-	-		
				AIUI	Analog input virtual	-	-	-		
				rIn	Reverse inhibition	yES	nO	yES		
				PSt	Stop key priority (press the "ENT" key for 2 sec. to change)	yES	yES	yES		
				CHCF	Channel configuration	SEP	SEP	SEP		
				Cdl	Command channel 1 - This parameter is only accessible if CHCF = SEP.	tEr	tEr	tEr		
				FLO	Forced local assignment	nO	nO	nO		
				FLOC	Forced local reference - Visible only if Forced local assignment FLO is not set to nO.	nO	nO	nO		

E2100-188 Altivar 12 AC Variable Speed Drive Parameters								
PARAMETER CODE					PARAMETER DESCRIPTION	1VFD TURNTABLE	2VFD FILM CARR. ELEVATOR	3VFD PRESTRETCH
MENU LEVEL 1	MENU LEVEL 2	MENU LEVEL3	MENU LEVEL 4	MENU LEVEL 5				
		FUn			Function menu			
			rPt -		Ramp menu			
				ACC	Acceleration ramp time	4.0 sec.	0.5 sec.	0.1 sec.
				dEC	Deceleration ramp time	4.0 sec.	0.1 sec.	0.1 sec.
				rPt	Ramp shape assignment	LIn	LIn	LIn
				rPS	Ramp switching commutation	nO	nO	nO
				brA	Decel ramp adaptation assignment	yES	dYnA	yES
			Stt -		Stop configuration menu			
				Stt	Type of stop	rMP	rMP	rMP
				nSt	Freewheel stop assignment	nO	nO	nO
				FSt	Fast stop assignment	nO	nO	nO
			rrS		Reverse	nO	L2H	nO
			AdC -		Auto DC injection menu			
				AdC	Operating mode	YES	YES	YES
				SdCI	Auto DC injection current (default 70% of nCr)	1.3	1.3	1.3
				tdCI	Automatic DC injection time	0.5 sec.	0.5 sec.	0.5 sec.
			JOG		Jog assignment	nO	nO	nO
			PSS -		Preset speed menu			
				PS2	2 Preset speeds	nO	nO	nO
				PS4	4 Preset speeds	nO	nO	nO
				PS8	8 Preset speeds	nO	nO	nO
			JPF		Skip frequency	0.0 Hz	0.0 Hz	0.0 Hz
			PId -		PID menu			
				PIF	PID feedback assignment	nO	nO	nO
			CL I -		Current limitation menu			
				LC2	2nd current limitation commutation	nO	nO	nO
				CL I	Current limitation (1.5 x nom. drive current)	3.0 Amps	3.0 Amps	3.0 Amps
			SPL -		Speed limit menu			
				LSP	Low speed	0.0 Hz	5.0 Hz	0.0 Hz
				tLS	Low speed operating time	nO	nO	nO
				HSP	High speed	60.0 Hz	60.0 Hz	40.0 Hz
				SH2	2 HSP assignment	nO	nO	nO
				SH4	4 HSP assignment	nO	nO	nO
			FLt -		Fault detection menu			
			rSF		Fault reset	L4H	L4H	L4H
			Atr -		Automatic restart menu			
				Atr	Automatic restrart	nO	nO	nO
			FLr		Catch on the fly	nO	nO	nO
			tHt -		Motor thermal protection menu			
				ItH	Motor thermal current (nameplate rating)	2.0 Amps	2.0 Amps	2.0 Amps
				tHt	Motor protection type	ACL	ACL	ACL
				OLL	Overload fault management (yes = freewheel sto	yES	yES	yES
				MtM	Motor thermal state memo	nO	nO	nO
			OPL		Output Phase loss	yES	yES	yES
			USb -		Undervoltage menu			
				Usb	Undervoltage fault management	0	0	0
				StP	Undervoltage protection	nO	nO	nO
				StM	Undervoltage ramp deceleration time	1.0 sec.	1.0 sec.	1.0 sec.
			Strt		IGBT test	nO	nO	nO
			LFL I		4-20 mA loss behaviour	nO	nO	nO
			InH		Detected fault inhibition assignment	nO	nO	nO
			SLL		Modbus fault management	yES	yES	yES
			drn		Degraded line supply operation	nO	nO	nO
			rPr		Reset power run	nO	nO	nO
			COM -		Communication menu (not used - skip this)			

16:0

**S
U
P
P
L
E
M
E
N
T
S**

